

What are unions offering engineers?

A union president tells — page 38

Low-cost plastic-leaf unit
makes brine filtration

1000 times more efficient — page 98

AUGUST 1957

FOR THE
MANAGEMENT TEAM

\$1.00 the copy

chemical processing

A Putman Publication / EXECUTIVE MAGAZINES FOR INDUSTRY

TARIFFS: HIGH or LOW?

Which is better for the chemical industries?



If too low, our industry will migrate . . . says
Dr. Lewis E. Lloyd, Dow Economist—page 30



If too high, our prosperity suffers . . . says
S. A. Swensrud, Ex-Chairman, Gulf Oil—page 31



C. P. Acids IN NO-DEPOSIT — NO-RETURN "LAB-SIZE" BOTTLES!

Laboratory chemists have always wanted "C.P." Acids put up in uniform, "hand-size" bottles that are ready for bench use. Now, B&A brings them to you—with the added advantage of no deposits, no returns. Just use them and throw away the empties.

Look at these important features. See what time- and money-saving benefits they give you. Then call your nearest Baker & Adamson office for full information.

Ideal Size! Optimum size and weight for convenient and safer handling, especially by women technicians and girl students.

Ready to Use! From stock room shelf to lab bench. No more time and trouble—and contamination hazard—in stock room transfers from bulk acid containers.

No Deposits, No Returns! Use them and throw away the empties. Forget the muss, fuss, and cost of cleaning and re-filling expensive shelf bottles.

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screw caps. No more glass stoppers to contend with as in old-fashioned bench bottles.

Uniform, Convenient Size! Same size handy "no-return" bottle is used for all acids. Contents by weight are:

Sulfuric Acid 2 lbs.
Hydrochloric Acid 1 1/4 lbs.
Acetic Acid, Glacial 1 lb.
Ammonium Hydroxide 1 lb.

And for Added Convenience and Economy, these "no-deposit" bottles are packed 12 to a "throw-away" fibreboard case, eliminating all returns, record keeping and extra freight costs.

For further information, write or phone nearest office below—

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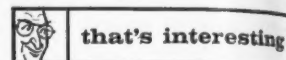
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When inquiring check 4966 opposite last page



that's interesting

Robot coffee sniffer

A vapor phase fractometer has been put to work by Southwest Research Institute, sniffing coffee. Machine has aided researchers in showing differences between the aroma—coffee "volatiles"—of differ-



ent batches of coffee. They hope to some day be able to tell coffee processors just how long to roast a particular batch. However, coffee still will have to be brewed properly to taste good.

"Seeing" colder objects by infrared

Window panes and lenses made of solid opaque silicon material, developed by Raytheon Manufacturing Company, allow invisible heat rays from sub-zero targets to reach a super-sensitive infrared detector. Conventional materials required targets to be 250 degrees or hotter. The human eye detects objects (in the dark) only when they are about 1000 degrees or higher.

A lot of pipe below

Today, there are approximately 378,000 miles of underground pipe line in the United States. This vast network falls into three classifications: crude oil lines; products lines; and gas transmission lines. Diameters range from 2 to 35". (The Power Specialist)

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...Thought-provoking slants
on projects and products

Aircraft "bugs" in mothballs

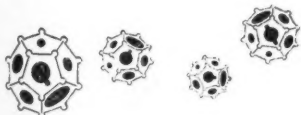
An exact melting point and a definite rate of expansion and contraction between melting and freezing points are why mothballs have helped eliminate aircraft instrument "bugs". Using naphthalene in instrument heaters, a temperature of 175.8° F can be maintained.

Small and mighty

New transistors, called photodiodes, are 10,000 times more light-sensitive than ordinary "electric-eye" and can control as much current as 100 standard photo-electric cells. With just a 1½-volt dry cell, a photodiode as small as a dime can operate a standard relay without amplification. (The Pall Filtration Companies, Poro-Scope)

"Pentagondodekaeder"

A small object with twelve sides, each a pentagon in which there is a hole varying in size and shape . . . a penta-



gondodekaeder. Found in Herculaneum in Italy and believed by some to be a kind of dice used in an ancient game, although the use was never definitely established. (The Hercules Mixer, Hercules Powder Co.)

A step in smog fight

Data for design of non-catalytic automobile exhaust after-burners is aim of \$44,550 contract awarded to Atlantic Research Corp. by Air Pollution Foundation. Experimental work will center around measuring combustibility of the exhaust gases.

Turn to next page

Dracco Airstream Conveyors lead the way in modern bulk handling

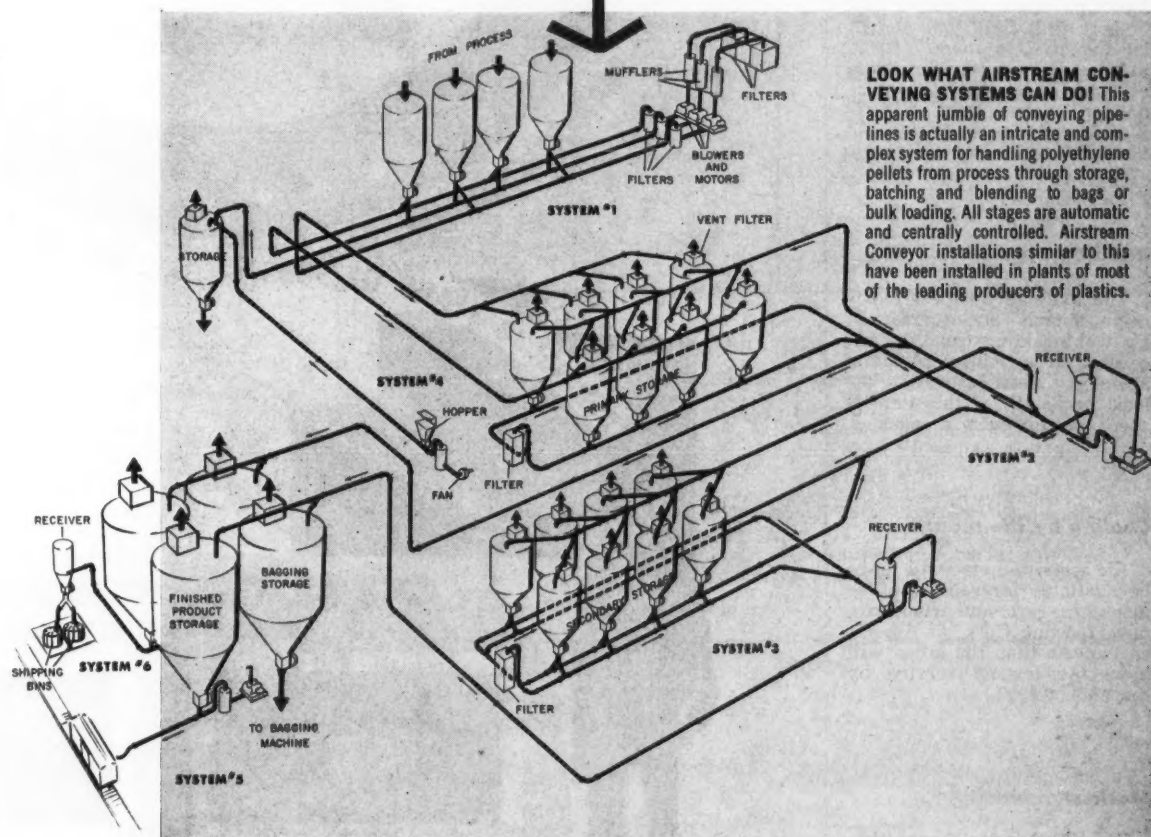
► Dracco Airstream Conveyors are the most advanced way to handle bulk materials. They are superior in contamination-free conveying of pure materials . . . gentle handling of friable materials . . . adaptability to automatic control . . . savings in labor, maintenance and material costs . . . installation flexibility . . . cleanliness, inside and out.

Today's Airstream Conveyors literally bring profits to your fingertips. Push-button controlled by one man, they move bulk materials swiftly and automatically through smooth-walled pipelines to any corner of the plant, or between plants. Diagrammatic arrangement of controls enables the operator to see at a glance all conveying paths in use and material levels in bins. Many operations can be performed: unloading, storing, reclaiming, blending, weighing, distributing and bulk loading.

These are not predictions of things to come, but are actual realities available from Dracco today. Companies planning automation of processes involving bulk materials should investigate handling the Dracco way. New Bulletin No. 530 gives full details. Write for your copy today.

DRACCO CORPORATION

4070 East 116th Street • Cleveland 5, Ohio



LOOK WHAT AIRSTREAM CONVEYING SYSTEMS CAN DO! This apparent jumble of conveying pipelines is actually an intricate and complex system for handling polyethylene pellets from process through storage, batching and blending to bags or bulk loading. All stages are automatic and centrally controlled. Airstream Conveyor installations similar to this have been installed in plants of most of the leading producers of plastics.

DRACCO

airstream conveyors
dust control equipment

When inquiring check 4967 opposite last page

THAT'S INTERESTING

Award design contract for atom-powered ship

US Maritime Administration has awarded contract for design of first atomic-powered surface ship to George G. Sharp, Inc., New York marine design firm, and Walter Kidde Nuclear Laboratories, Inc., Garden City, N.Y., atomic industrial designers and consultants. Vessel's power plant will be pressurized water reactor similar to one used in the Nautilus, first nuclear-powered under-the-surface vessel.

The inside story

A streamlined miniature TV camera is now available for examining remote, cramped locations such as tubes and boilers. Unit, 5 1/4" long and 2" in diameter, is manufactured in West Germany and distributed in US by Majestic International Sales, Dept. CP, 79 Washington St., Brooklyn, N. Y. Check 4968 opp. last page.

Reading time

The average business executive spends one-quarter of his waking hours reading, according to an American Management Assn. survey. At least one-sixth of this time is spent on business magazines.

Cooling by the month

Air conditioners will soon be available for rent as office machines, cars, and trucks are now. Leasing Corp. of America expects that 100 cities will have the leasing service by the end of 1957.

Static stymied

Process that creates a skin of cotton-like cellulose around each fiber of synthetic fabrics has been developed by Celanese Corp. of America. Permanent anti-static properties are achieved, and all desirable qualities are retained.

OTM HAS GROWN

Thirty-eight years ago OTM employed 3 workers using 4,000 square feet of floor space.

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CHEMICAL PROCESSING

chemical processing

with which is combined
CHEMICAL PROCESSING PREVIEW
and Chemical Business

For the management team

Vol. 20

August 1957

No. 8

Published Monthly by

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Accepted as Controlled Circulation publication at Mendota, Illinois. Publication office: 1501 W. Washington Road, Mendota, Illinois. Address all correspondence to Editorial and Executive office, 111 East Delaware Place, Chicago 11, Illinois.

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AUGUST 1957

ATLAS



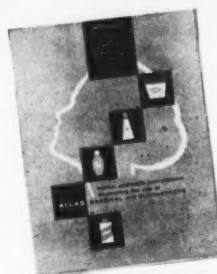
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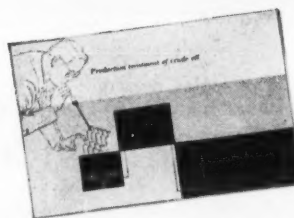
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Aids



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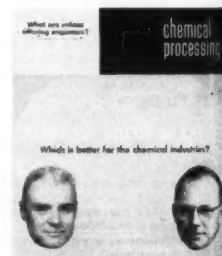
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THIS MONTH'S COVER

Two of the top authorities in the country on the tariff question — Dr. Lewis E. Lloyd of Dow Chemical and Sidney A. Swensrud, Chairman of the Committee for a National Trade Policy and ex-chairman of Gulf Oil — are shown against the background of a world map.

Dr. Lloyd warns that the trend to tariff reduction can seriously harm the US economy. Mr. Swensrud argues that a liberal tariff policy can bolster it. These articles start on page 30.



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• To subscribe to this magazine, see reader-qualification form opposite last page



over the editor's
shoulder



"Food" . . . for the Management Team

Every month, **CHEMICAL PROCESSING** features a number of articles dealing with broad management problems of our industry. Some of these subjects and treatment are naturally provocative . . . and are presented to keep you informed on questions fundamental to the economic health of the chemical processing industries.

For example, in this issue, starting on page 30, you'll find a "debate" on whether or not we should liberalize our tariff policy. On page 38 there's a strong argument for unionization of the scientist and engineer (to be followed later by an article that says unionization is *not* for the technical employee).

Does this type of material have anything to do with processing? Of course it does! These questions are so basic that how they're answered can't fail to determine the future course of your processing and the products you make. You can't afford to overlook these broad factors because many of them will affect, and are affecting, the fundamental overall aspects of your company's operations!

You will be seeing more of these discussions in future issues. But along with them — as always — you will find the usual intensive coverage of methods, equipment, instruments, and materials for helping you to improve your processing procedures.

Many of you won't agree with what these authorities say about some of the controversial topics . . . just as we won't be in accord with all of them. If you disagree, agree, or have something pertinent to add, we hope you'll write us. Only by airing all sides of an issue will the management team be given the material from which to make the best decision for its particular case.

Dana B. Berg

MANAGING EDITOR



[®]*Traveloader* easily handles bulky heat exchanger bundles with **ONE** machine and **ONE** operator

• Traveloader, the unique Baker side-loading fork truck, is ideally suited for removing, storing and installing heat exchanger tube bundles. In the above photo, it is placing a bundle it has just removed from a process system, onto "Christmas Tree" racks in yard storage.

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industrial trucks

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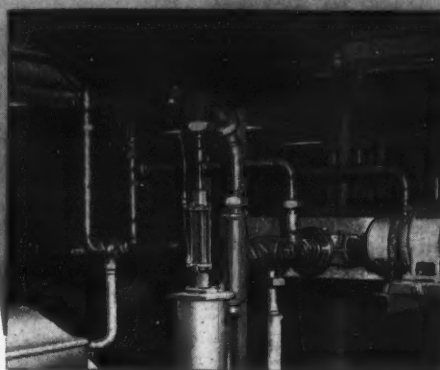
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help control quality at
A. B. DICK COMPANY plant

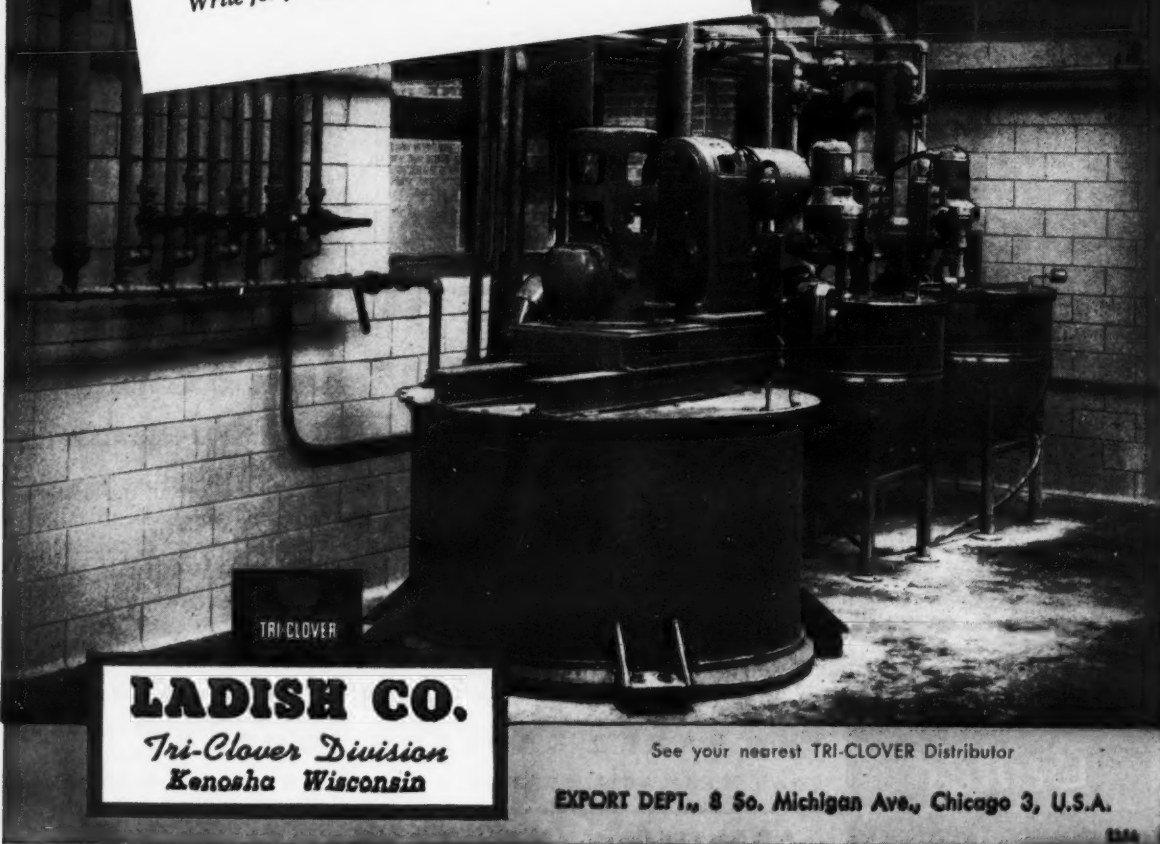
♣ A. B. DICK® is a name known for highest quality duplicating machines, folding machines, and impression paper. At their ultra-modern plant in Chicago, this progressive company makes certain that their reputation for quality is protected in all phases of operation.

In making aqueous base clay paper coatings, for example, A. B. DICK Company makes extensive use of Tri-Clover Division's sanitary type stainless steel fittings, compression valves, and plug valves, as well as Ladish Co. tube O.D. butt welding stainless steel fittings.

This is just one more good example of the way in which Tri-Clover fittings, valves, pumps and tubing serve industry by protecting product quality and insuring full corrosion-resistant processing lines. Write for further details.



Shown below is the mixing room where aqueous base clay paper coating is prepared, using Tri-Clover fittings and valves. The view above is a close-up taken from underneath the coating mixer, showing Tri-Clover fittings, compression valves, plug valves and air-actuated kettle valve.



LADISH CO.

Tri-Clover Division
Kenosha Wisconsin

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conventions
and exhibits

August 20-23. Western Electronic Show and Convention, Cow Palace, San Francisco.

September 8-13. American Chemical Society, national meeting, New York.

September 9-13. The Instrument Society of America, 12th Annual Instrument Automation Conf. and Exhibit, Auditorium, Cleveland.

September 10. Synthetic Organic Chemical Manufacturers Association, luncheon meeting, Hotel Roosevelt, New York.

September 11-13. National Petroleum Association, 55th annual meeting, Traymore Hotel, Atlantic City.

September 11-15. Twelfth Annual Instrument-Automation Conference and Exhibit, Auditorium, Cleveland.

September 15-18. American Institute of Chemical Engineers, meeting, Lord Baltimore Hotel, Baltimore.

September 16-17. Chemical Market Research Association, meeting, Lake Placid, New York.

September 30-October 1. Material Handling Institute, Inc., Joint-Industry Fall meetings, Greenbrier Hotel, White Sulphur Springs, West Virginia.

September 30-October 2. American Oil Chemists' Society, meeting, Netherland Plaza Hotel, Cincinnati.

October 7-9. 1957 National Electronics Conference, 13th Annual Forum on Electronic Research, Development, and Application, Hotel Sherman, Chicago.

October 15-18. Scientific Apparatus Makers Association, midyear meeting of Recorder-Controller Section, Seaview Country Club, Absecon, N.J.

October 20-23. Scientific Apparatus Makers Association, midyear meeting of Indus-

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Meetings and shows of
interest to the chemical
processing industries

trial Instrument Section,
Grand Hotel, Point Clear,
Alabama.

October 21-25. National Metal
Exposition, Chicago.

October 21-25. 45th National
Safety Congress and Expositi-
on, Conrad Hilton Hotel,
Chicago.

October 23-24. Computer Ap-
plications Symposium, spon-
sored by Armour Research
Foundation, Hotel Sherman,
Chicago.

October 28-31. The National
Industrial Packaging & Hand-
ling Exposition, Conven-
tion Hall, Atlantic City.

October 28-31. American Nu-
clear Society, second winter
meeting, Henry Hudson Ho-
tel, New York.

October 30-November 2, Fed-
eration of Paint and Varnish
Production Clubs, 35th an-
nual meeting, Bellevue
Stratford Hotel, Philadel-
phia.

November 2-8. Second World
Metallurgical Congress,
sponsored by American So-
ciety for Metals, Chicago.

November 11-14. American
Petroleum Institute, meet-
ing, Conrad Hilton Hotel,
Chicago.

November 12-14. National As-
sociation of Corrosion Engi-
neers, Northeast Region, fall
meeting, Penn-Sheraton Ho-
tel, Pittsburgh.

November 13-14. Air Pollution
Conference, co-sponsored by
Armour Research Founda-
tion and Midwestern Air
Pollution Prevention Asso-
ciation, Chicago.

November 14-16. The Ameri-
can Society of Refrigerat-
ing Engineers, semi-annual
meeting, Shoreland Hotel,
Chicago.

November 18-21. Air-Conditi-
oning and Refrigeration
Institute, Tenth Exposition,
International Amphitheater,
Chicago.

December 2-6. 26th Exposi-
tion of Chemical Industries,
Coliseum, New York.

when you have to
separate a **SOLID**
from a **LIQUID**

Look at this BIRD
first!

*It may save you a
whole lot of time,
trouble and money*



The Bird Continuous Centrifugal Filter meets a greater
range of solids-liquids separating conditions than any other
type of filter or centrifuge. That's why we say look at this BIRD *first*.

Solids Can Be Coarse or Fine or a Mixture

— as coarse as half inch, as fine as a fraction of a
micron, or any combination in any proportion.

Feeds Can Be Thick or Thin

— slurries are being handled from two to seventy per
cent solids and can vary all over the lot without throw-
ing this BIRD off stride.

Feeds Can Be Hot or Cold

— in actual application the range is from minus 100° F
to plus 300° F. Hot saturated liquids are "duck soup"
for this BIRD. Temperature change in the BIRD is rela-
tively slight.

Materials Can Be Volatile or Hazardous

— the BIRD can be made vapor or fume tight and
can be constructed for operation under pressure when
required.

Solids Can Be Washed

— an efficient counter-current wash action is effected.
When leaching time is a factor in wash thoroughness,
BIRDS may be installed in series with repulp between.

Volume Can Be Large or Small And Can Vary

— the BIRD comes in several sizes. Solids throughout
may range from 200 to 120,000 lbs. per hour; filtrate
from 1 to 700 gpm.

THINK about the conditions your solids-liquids separations
must meet. Can any other filtration equipment meet them all?
Meet them as well as the BIRD?

The Bird Research and Development Center is fully equipped to provide authentic and
confidential test findings on a pilot scale. Use it to make certain of best results before you invest
in any solids-liquids separating equipment.

BIRD

MACHINE COMPANY

- Bird Continuous Centrifugal Filter
- Bird Pressure Centrifuge, Rotary, Vertical, Vacuum Filter
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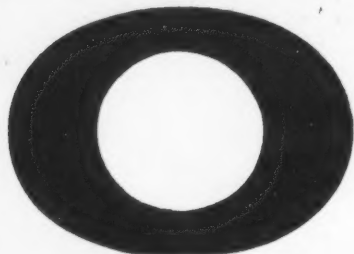
When inquiring check 4973 opposite last page

Oxygen doesn't always mean "life"

Eastman antioxidants are extending the useful life of products in many fields

Many products need protection against oxygen.

Lard, a typical example, turns rancid at room temperatures unless protected by the addition of an antioxidant. "Returns" and complaints of off-flavor and rancidity have long been the bane of vendors of shelled nuts. Today, thanks to the availability of an Eastman antioxidant, nut



processors can practically eliminate such complaints and greatly expand their product's distribution. The longer shelf life made possible by Eastman antioxidants, has likewise helped potato chip manufacturers broaden their selling area.

Eastman antioxidants have also helped to develop a new outlet for inedible fats and oils . . . animal feeds. Added to feed in amounts up to 4% to 5%, these fats improve the feed and represent a market of 200-300 million pounds annually. This was a totally new market for fats and helped ease a fat-surplus problem for the meat industry. Yet, it would have been impossible if antioxidants had not been available to stabilize the fat and keep the feeds fresh and palatable.

Eastman antioxidants protect many different food products, but an even broader field is covered by their use in industrial products.

In gasoline and motor fuels, antioxidants made by Eastman protect against the formation of power-robbing gum.

In transformer and turbine oils,

Eastman antioxidants extend service life by preventing the quick breakdown that might otherwise occur at the high working temperatures encountered.

In plastics, Eastman antioxidants help stabilize plasticizers for vinyl resins and are also used to protect polyethylene against deterioration during molding and extrusion and upon extended exposure.

In rubber, antioxidants play a well-known role in protecting against aging and heat deterioration. Rubber also needs protection against ozone—one of the most powerful oxidizing agents known. Even the minute concentration of ozone in the atmosphere can severely damage rubber products. To combat this attack, Eastman antioxidants are available.

In the agricultural field Eastman antioxidants are extending the effectiveness of such important pesticides



as pyrethrum. In poultry feeds other Eastman antioxidants are widely used to bring more chicks to faster and more profitable maturity by protecting vitamin content, stimulating growth, improving pigmentation, in-

creasing the utilization of Vitamin A from carotene and safeguarding chicks against such deficiency diseases as encephalomalacia.

This list could be continued to show that whenever oxygen poses a destructive threat to organic compounds there is a good chance that an Eastman antioxidant is available for effective counter measure.

Perhaps one of the many antioxidants made by Eastman could help you add life to some product you



make or use. Perhaps, as the foregoing examples illustrate, one of these antioxidants could help you combat rancidity, bad odor, off-flavor, loss of nutrient value, discoloration, embrittlement or aging.

Eastman antioxidants have helped many companies extend present markets and even develop new markets. If your product—be it food, agricultural or industrial—needs protection against oxidative deterioration, call in Eastman. Eastman's food and industrial antioxidant laboratories are staffed with specialists anxious to help you explore the benefits, the use, and the cost of antioxidants.

For more information, write to EASTMAN CHEMICAL PRODUCTS, INC., a subsidiary of Eastman Kodak Company, KINGSPORT, TENNESSEE.

Products in these fields know the value of Eastman antioxidants

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RUBBER	ANIMAL FEEDS
PLASTICS	HYDRAULIC FLUIDS
PETROLEUM	TRANSFORMER OILS
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Eastman ANTIOXIDANTS to combat oxidative deterioration

SALES OFFICES: Eastman Chemical Products, Inc., Kingsport, Tennessee; New York City; Framingham, Mass.; Cincinnati; Cleveland; Chicago; St. Louis; Houston. West Coast: Wilson Meyer Co., San Francisco; Los Angeles; Portland; Salt Lake City; Seattle.

When inquiring check 4974 opposite last page



looking ahead to next month

What do engineers and chemists think . . .

. . . about the various methods chemical and allied companies use to reward them for patentable ideas?

A survey covering engineers and chemists in 77 top companies brings out some enlightening thinking on this subject. Their comments and opinions will appear in September's CHEMICAL PROCESSING.

Management's stake in today's advanced control techniques

At the invitation of CHEMICAL PROCESSING magazine, more than twenty of the industry's top-ranking experts on instrumentation and data reduction met for CP's Panel on Instrumentation . . . to clarify policy objectives and management considerations in achieving the "automatic processing plant."

Even some industry leaders have had hazy ideas about management's objectives in furthering automatic process control. Is labor saving the primary objective? How much does the cost factor affect the development of automatic control?

The September Instrumentation and Control feature includes a detailed report on the findings of the panel, and on what you—as a member of the management team—must know about "The Automatic Processing Plant."

And Joseph H. Lancor, Engineering Vice President of Consolidated Electrodynamics, writes on the use of automatic data equipment in the chemical industries today.

Additional stories . . . Plant Manager R. L. Nielsen tells of process control at Lithium Corporation's new plant at Bessemer City, N. C. And R. E. Boedeker, Plant Manager at Container Corporation's Los Angeles plant, tells how an

Quick pre-highlights Chemical

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More on

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Quick previews of some
highlights in September
Chemical Processing

industrial flow colorimeter
monitors water quality and
determines amount of solids
going into paper machine.

There'll be more case his-
tories, nomographs, and re-
cent instrumentation develop-
ments . . . all to help you with
your control problems.

More on tariffs

The discussion of the tariff
question starting in this issue
(page 30) will be carried fur-
ther in the September issue of
CHEMICAL PROCESSING.

We asked a number of
chemical company executives
for their thoughts and opin-
ions on the subject. Read what
these important leaders have
to say about tariffs and the
chemical industry: Rothe
Weigel, President of Victor
Chemical; new Allied Presi-
dent, Glen Miller; Ernest Hart,
President of Food Machinery
and newly elected Chairman
of the MCA; Harry A. Bullis,
Board chairman at General
Mills; Thomas D. Cabot, Pres-
ident of Godfrey L. Cabot,
Inc.; Thomas G. Hughes, Pres-
ident of Oronite Chemical
Company; and R. B. Semple,
Wyandotte President.

"Management must sell itself to the employee" . . .

. . . says Fred C. Foy, Koppers
Company President. "It's been
taking a licking in its battle
with the unions for the minds
of men . . . and unions are
'way out ahead and growing
more influential."

What can management do?
Foy outlines a plan of action
in CHEMICAL PROCESSING for
September. In order for the
employee to formulate opin-
ions he needs discussion from
both sides. "The unions are
doing a terrific job in pre-
senting theirs," says Foy. "It's
up to management to present
theirs, too."

where the need is *Critical*

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PLASTIC**



THERE are some fields of industry, some professions, where more than ordinary care is required. Food is one, medicine another, chemical research a third. Here purity in its truest sense must be enveloped with meticulous care every step of the way.

Relatively minor elements of equipment often play a vital part. For example, if the tubing used to transport liquid food should be attacked by one of the food chemicals trouble could be serious; a life could be endangered if the wrong tubing were used to convey blood or blood plasma; a research project could fail if contaminants leached out to spoil a solution.

This is why those whose job it is to safeguard purity specify Tygon Tubing for critical tasks. This flexible, plastic tubing, crystal clear, flexible as a piece of string, tough as leather, resistant to acids and alkalies, offers a combination of properties found in no other material.

And like metal alloys, basic properties of this unique "flexible glass" plastic tubing can be varied to meet a wide range of special requirements. Thus, Tygon Tubing is made in many standard formulations and in innumerable special ones.

That is why those whose job it is to safeguard purity specify the specific formulation of Tygon Tubing designed to fit their exact needs . . . for they know, as do we, that no single formulation can do all things well.

Tygon plastic Tubing is made in many for-
mulations, each designed for a specific usage
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Write for Bulletin T-97.

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recent books

reviews of current technical and reference work
... summarized for you by authorities in the
field with the CP staff

Engineering Uses of Rubber

Reviewed by
DR. HOWARD M. BUCKWALTER
Detroit, Michigan

Profusely illustrated book edited by Archibald T. McPherson and Alexander Klemm, with an introduction by the late E. A. Hauser, is written in terse, lucid style by a group of authors drawn from industry and education, each one of whom is a recognized authority in his field. Depending on the point of view, this volume may be considered a dictionary, a textbook, or a handbook with occasional do-it-yourself overtones.

It embraces a rather wide spectrum of factual and practical rubber technology. Text, supplemented by 87 photographs, 96 graphs, 90 sketches, 60 tables and supported by numerous recent references at the end of each chapter, covers preliminary mechanical preparation of raw rubber (natural and synthetics) for subsequent compounding, vulcanization and fabrication. Book describes compounding and vulcanization methods in current, general use; it defines and interprets important physical properties and official specifications of rubbers designed for specific end uses, and describes modern instruments that are employed for measuring these properties.

A chapter of general interest is devoted to the causes and prevention of the deterioration of rubbers from use and with age; another discusses the relationships that exist between mechanical properties of rubber and its molecular structure. Three chapters dwell at considerable length on

types, properties and requirements of rubbers employed in the civil, chemical and electrical engineering fields, respectively.

Specific engineered rubber products that are described and discussed in detail include rubber mountings, tires, rubber accessories employed in automobile and airplane construction, and conveyor and power transmission belts.

To obtain "Engineering Uses of Rubber" remit \$12.50 direct to Reinhold Publishing Corp., 430 Park Ave., New York 22, New York.

Organic Analysis

Reviewed by DANA S. DAVIS
Mobile, Alabama

The *Organic Analysis* set, Volume III being the most recent addition, presents modern techniques and procedures with an emphasis on general methods for determination of functional groups. Volume III, co-edited by John Mitchell, Jr., I. M. Kolthoff, E. S. Proskauer, and A. Weissberger, was brought to print in 1956 and extends over 546 pages which include 57 figures and 109 tables. Inclusive and well-written, text entails liberal coverage of determination of organic acids, acid anhydrides, amines and amides, and olefinic unsaturation. Undertaken, also, is an expositive treatise on analytical mass spectrometry and another on classification and identification of synthetic organic coating resins.

Quantitative procedures considered in chapters that deal with determinations are handled by a useful pattern

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of discussions, lists of reagents and apparatus, and sample preparations with calculations. Brief, informative histories serve as introductions for all subject matter and are splendid complements for the lengthy, complete lists of bibliographies which follow each chapter. Preceding the excellent subject index is a table of abbreviations.

To obtain "Organic Analysis, Vol. III" remit \$8.50 direct to Interscience Publishers, Inc., Dept. CP, 250 Fifth Avenue, New York 1, N. Y. Specify 4977 opposite last page.

Heterocyclic Compounds, Vol. 5

Reviewed by
TOD W. CAMPBELL
Pioneering Research
Laboratory

E. I. du Pont de Nemours & Co.

This excellent volume continues the series on Heterocyclic Compounds edited by Professor Robert C. Elderfield. Subject matter is dealt with by a series of highly qualified experts. Thus, Professor Elderfield and Dr. Franklin W. Short review "Dioxolane and Its Derivatives," Professor T. L. Jacobs discusses "Pyrazoles and Related Compounds," and Professor Elderfield presents the latest information on "Indazoles." Dr. J. W. Cornforth has contributed two chapters, one on "Oxazole and Its Derivatives," the other on "Benzoxazole and Related Systems." Professor Roderick A. Barnes has a chapter on "Isoxazoles," while Drs. James M. Sprague and A. H. Land have thoroughly reviewed "Thiazoles and Benzthiazoles."

This volume is another example of the excellent quality of technical books from this publisher. The paper and binding are first rate, and the type is clear and easy to read. Literature citations are set up in such a way as to be readily found, not buried in some obscure location a long way from the place in the text where the reference is quoted. No experimental details are

given; however, synthetic methods for the more important compounds are described in considerable detail, and yields are often given.

The 744-page book is relatively expensive; hence it probably will not find its way to the private bookshelf of anyone not working exclusively in the field of heterocycles. It is, however, an extremely valuable reference book, being sufficiently exhaustive for the expert, as well as sufficiently readable for the casual user.

To obtain "Heterocyclic Compounds, Vol. 5" remit \$20 direct to John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N.Y. When inquiring specify 4978 opp. last page.

The Chemical Formulary Volume X

Contained in this 392-page, octavo-size reference book are many hundreds of formulas for making adhesives, cosmetics, paint, soaps, lubes, waxes and polishes, rubber and plastics, and many specialties. Conversion tables, and a detailed listing of chemical materials and their manufacturers are given in the appendices.

To obtain "The Chemical Formulary, Vol. X" remit \$8.00 direct to The Chemical Publishing Co., Inc., Dept. CP, 26 Court St., Brooklyn 2, N. Y. When inquiring check 4979 opposite last page.

Turn to next page

Wanna Make Nomographs?

This month Dr. Davis begins his series of enlightening articles delving into the mysteries of making nomographs. Be sure to catch the first installment appearing in the Processing and Engineering Data section, page 71.



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If your problem is space and inventory, Allpax has the answer. Allpax "Universal" Packings save valuable stockroom space and reduce inventories. Included in the complete line of Allpax mechanical packings are four basic, universal styles that will cover the majority of your requirements. Result: Less inventory required—more stockroom space available.

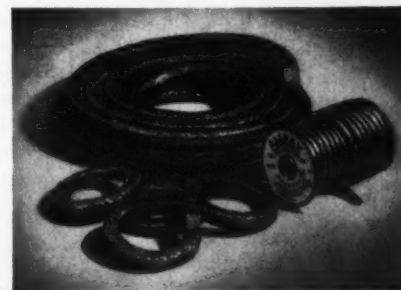
Allpax Styles 1, 2, 5, and 14 are "Packing Insurance" against steam, water, air, chemicals, acids, oils, etc., over a complete range of temperatures and pressures. Finest materials plus engineered construction are combined to produce our unbeatable, all-purpose packings that provide a tight seal without danger of scoring or unnecessary wear. Warranted to be free from defects in materials and workmanship.

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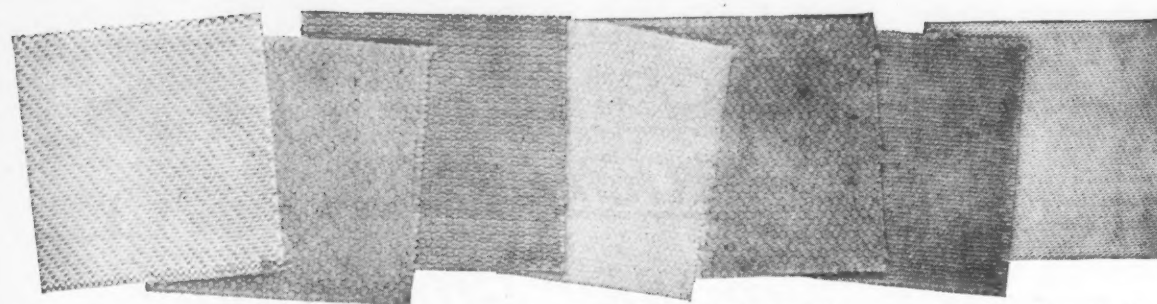
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How many of these filter fabrics



filament nylon twill

cotton filter duck

spun
dynel

spun
nylon

No. 4 cotton duck

spun
dynel twill

filament nylon

can you match up
with
these
jobs?

1. filtering gluten on iron plate-and-frame presses	?
2. separating dye intermediates from a HCl and H ₂ SO ₄ solution at 45° C.	?
3. filtering clay slurries	?
4. filtering NaOH at elevated temperatures	?
5. clarifying thick beet sugar juices at 90° to 96° C.	?
6. filtering coal slimes on continuous vacuum filters	?
7. filtering oil and glycerin under 200° F.	?

The typical Wellington Sears filter fabrics shown here were actually assigned the filtration jobs listed above. They were the answers in *these* particular cases; on other occasions, and under other circumstances, another fabric or another construction might have been specified, according to the needs of the actual problem. Which means a great deal of information must be accumulated and examined — information which you obviously would need in

order to answer our “question” headlined above. But this “impossible” exercise does serve to make one point very strongly: that it takes a filter fabric specialist to establish and evaluate *all* the requirements of *each* job, to determine which filter fabric to use. That’s why our experience, and the experience of the people who distribute our filter fabrics, can be so helpful to you. Just call. For free copy of “Filter Fabric Facts,” address Dept. M-8.

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RECENT BOOKS

Enterprise in Oil

The problems of establishing a pioneer chemical business in the depth of the depression are related in Kendall Beaton's biography of Shell Oil Company and its affiliates in America. Author Beaton writes of the company's affairs with candor and objectivity, explaining the “whys”, “hows”, and “whos” behind many of the company's major decisions over the years. Failures as well as successes are treated in the 816-page volume.

A panoramic history of other oil companies, big and small — competitors and acquisitions — is included in the book's scope. Eight line drawings, seven maps (including a map of Shell operations in 1956), and 149 halftone illustrations help document and portray the company's story.

Besides the excellent index, appendices following the text contain a chronology of important dates in Shell's history, lists of officers of all the main Shell companies in the United States, and statistical tables of operating and financial data from 1912 to the present.

To obtain “Enterprise in Oil” remit \$7.50 direct to Appleton-Century-Crofts, Inc., Dept. CP, 35 W. 32nd St., New York, N.Y. When inquiring specify 4982 on form opp. last page.

Pilot Plants, Models, and Scale-up Methods in Chemical Engineering

From England comes this 307-page book by Robert Edgeworth Johnstone and Meredith Wooldridge Thring presenting a study of the ways in which model theory and empirical extensions of it can be used in the design of pilot plants and models, and in the interpretation and scaling up of experimental results.

Opening chapters deal with similarity, dimensional analysis, the regime concept, similarity criteria, extrapolation, and other theoretical principles. Later chapters show how

Turn to page 15

NEW!



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...cuts cost of light-duty piping

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Tube Turns announces a new lightweight welding neck flange for service up to 125 lbs. W.O.G. pressure, offering two important cost-cutting advantages: (1) It is priced lower than conventional flanges. (2) This lightweight welding neck flange has a tapered face which affords an effective seal with reduced bolt loading; hence, permits use of steel butt welding neck flanges without danger of cracking the flat faced cast iron flanges of valves and pumps used in low pressure piping systems. Here is another result of Tube Turns pioneering research, and an example of how you get *more for your money* when you specify TUBE-TURN Welding Fittings and Flanges and buy them from your nearby Tube Turns' Distributor.



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RECENT BOOKS

these principles are used in scaling up many chemical engineering operations (such as filtering, heat transfer, packed towers, mixing, reactors, furnaces and kilns).

Approach is analytical and quantitative, but with enough descriptive matter and worked examples to show how the principles are applied. Final chapter deals with mathematical theory of analog models.

Most of the results have been reduced to the form of simple "scale equations" which can be applied directly to practical cases. These equations express ratios of performance figures in model and prototype under specified operating conditions.

Model theory as applied to process plant is a relatively new field, so the authors have set up a terminology summarized in the appendix.

To obtain "Pilot Plants, Models, and Scale-up Methods in Chemical Engineering" remit \$9.50 direct to McGraw-Hill Book Company, Inc., 330 W. 42nd St., New York 36, N. Y.

Technical Data on Plastics

Notebook-size, 224-page data book describes, in easy-to-find catalog style, the properties of all commercially available plastics. Designers, engineers, molders, and fabricators will benefit from this book.

Nine classes of thermosetting materials and fourteen classes of thermoplastic materials are covered, as are foamed plastics and plastic films. A chapter treats of the design of plastics for strength.

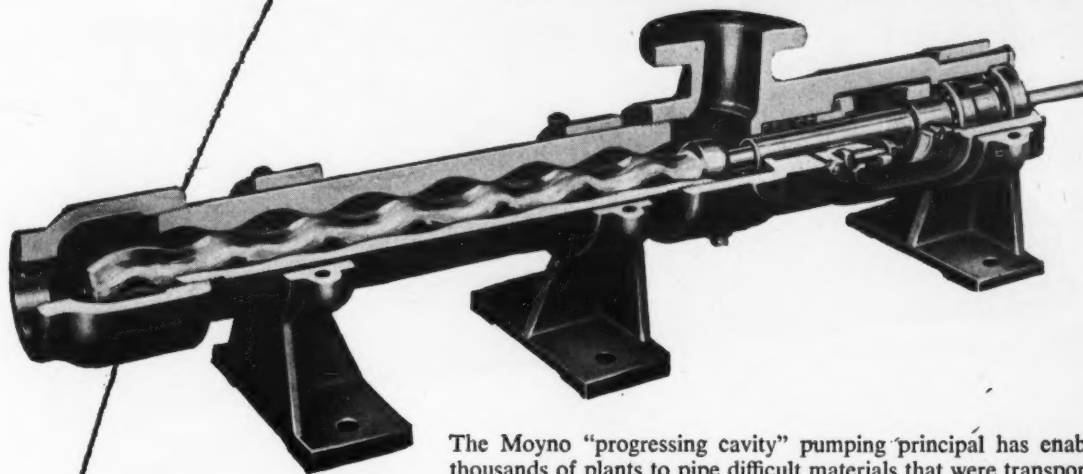
To obtain "Technical Data on Plastics, 1957 Ed." remit \$3.25 direct to Manufacturing Chemists' Association, Dept. CP, 1625 Eye St., N.W., Washington 6, D.C. When inquiring check 4983 opposite last page.

For more information on product at left, specify 4984 . . . see information request blank opposite last page.

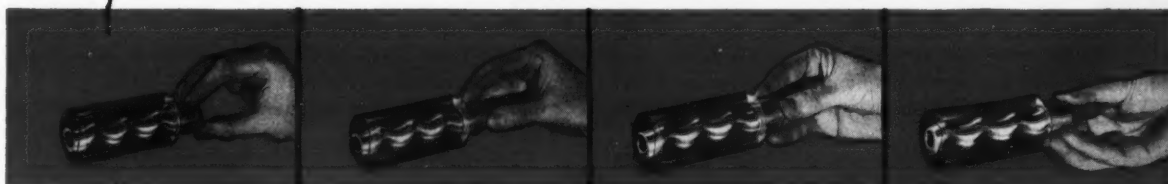
from abrasive slurries
to delicate foods . . .

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As shown above, Moyno Pumps have a screw-like rotor that revolves in a double threaded stator creating progressing cavities which smoothly move material through the pump. They will pump anything that will move through a pipe . . . even plaster and non-pourable pastes!

Moyno Pumps are available in capacities up to 500 gpm and pressures up to 1000 psi.

Examine your processing methods. No doubt there are several places where Moyno Pumps can drastically cut costs. Ask us, we'll give you a frank answer. Send us an outline of your problem today! Write for Bulletin 30-CP



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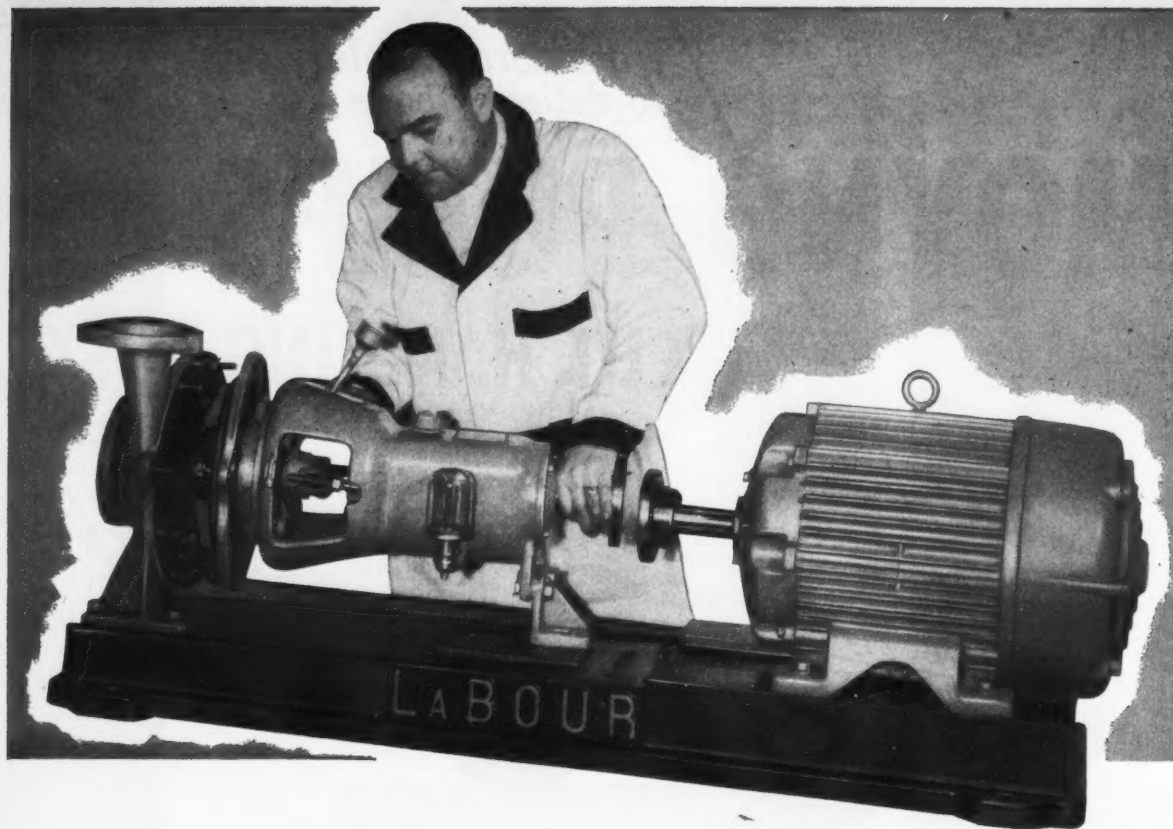


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The complete drive unit, including the impeller, of this new Type SZ LaBour pump is removable as a unit for replacement or maintenance—leaving piping and motor undisturbed and in perfect alignment.

Although Type SZ is a non-priming pump, its design permits it to handle large quantities of air or gases mixed with the liquid, so that aerated solutions or volatile materials—within reasonable

limits—cause no trouble whatever. The fully open impeller and absence of sealing rings or other closely fitted pumping parts give this pump the ability to move dirty liquids without clogging or loss of efficiency.

LaBour dependability, long the recognized top in the industry, is built into this newest LaBour unit. Practically any requirement as to corrosion-resistant materials can be met.



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nuclear notes

Lack of mill facilities bottlenecks U-ore

Mining of uranium ore at Wyoming's Gas Hills area has gone ahead at such a rapid pace that it has far outstripped milling capacity. The resulting AEC decision to slash purchasing quotas dealt a blow to independent operators who were relying on the government's buying program to keep them in business until a steady market was established through sufficient private operator milling facilities.

Most Gas Hills producers have filled their allotted quotas for first half of 1957. Other mines are continuing exploration, stockpiling at minesites waiting for Lucky Mc (Jan. 1958) and Western Nuclear (July 1957) mills to open. If these mills cannot handle growing ore production, some independent miners may be forced to sell out to large-scale operators.

USDA turns to cobalt-60 to speed research

US Department of Agriculture is going to use cobalt-60 to speed up investigations into new uses of cotton and other crops. A two-ounce supply of radioactive cobalt was recently delivered to USDA's Southern Utilization Research and Development Division in New Orleans.

It is one of the largest single supplies of this material outside of Oak Ridge. Future research also calls for radiation treatments to help create new products from pine gum, tung oil, and castor oil.

Nuclear power proposal by Florida utilities

Three electric power companies constituting Florida Nuclear Power Group have submitted a formal proposal for development, design, and

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AUGUS

...Significant news about
atomic energy

construction of nation's first large-scale nuclear power plant using natural uranium as its fuel. Proposal calls for heavy water-moderated, gas-cooled reactor, having net electrical capacity of 136,000 kilowatts. Preliminary estimate of plant cost is approximately \$40 million.

Godiva II operates at Los Alamos

New critical assembly has been placed into operation at the University of California's Los Alamos Scientific Laboratory. Known as Godiva II, the device is a bare uranium-235 assembly (having no neutron reflector around critical region) designed specifically as a controlled prompt critical irradiation assembly.

There are three control rods which enter assembly from beneath — two of which are screw-driven reactivity rods. The third is fired into the assembly by pneumatic cylinder and is used to develop prompt critical bursts.

Experiments will be observed by television as well as by instruments. Control building is located ¼ mile from assembly area.

Largest atom smasher to be finished 1960

Westinghouse has announced that it will supply electrical equipment to power the world's largest atom smasher now under construction at Brookhaven. The equipment will feed power to 240 magnet cores which are arranged in a ring 842 feet in diameter.

Protons will speed around this ring with energies of 25 to 30 billion electron volts. The Brookhaven synchrotron, planned for operation in 1960, will be three times as powerful as Russia's and will return the leadership in this field to the US.



WHAT BUT A BELT CONVEYOR could carry this load for so few pennies a ton?

Moving at high speed—24 hours a day if required—belt conveyors handle huge tonnages in a continuous stream. Loading and unloading delays are eliminated,

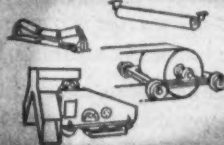
and there's no time lost on empty return runs. Operating costs are relatively low, based on cost per ton handled. In fact, economies of belt conveyor operation and upkeep generally top any other form of bulk material transportation. And thanks to their extreme flexibility, installation is easy even in difficult locations.

WHO BUT LINK-BELT offers such a complete belt conveyor service? For any requirement—new installation or modernization job—Link-Belt will plan it, equip it, erect it and stand behind it. Our engineers can choose from industry's

most comprehensive idler line—plus a broad range of pulleys, drives, terminal machinery and auxiliary equipment. Because all drawings and equipment come from one source, responsibility is centralized . . . no need to waste valuable engineering man-hours coordinating drawings from several sources.



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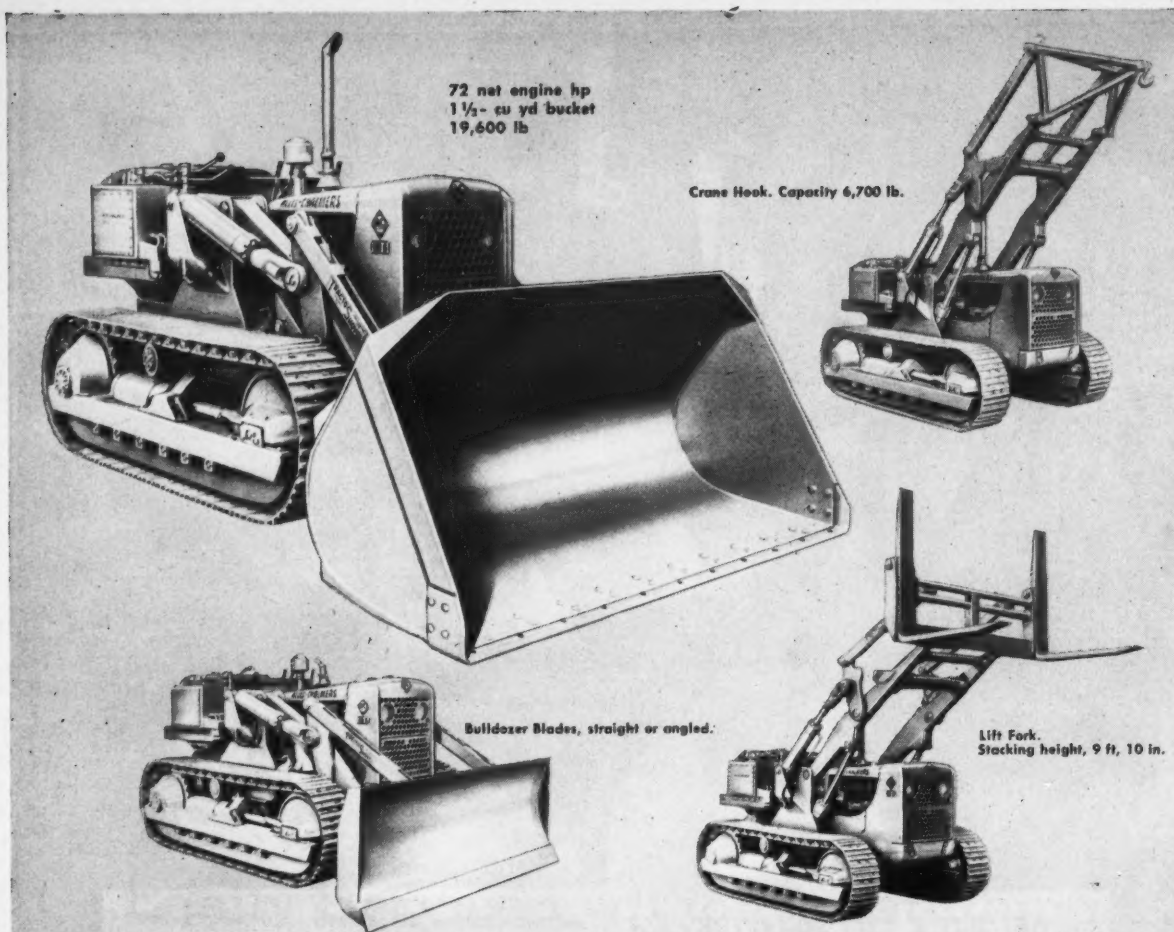
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LINK-BELT

BELT CONVEYOR EQUIPMENT

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville (Sydney), N.S.W.; South Africa, Springs.

When inquiring check 4987 opposite last page



HERE'S THE KEY TO OUTDOOR STORAGE

Flotation, balance and stability for all ground conditions; traction and power for heavy work; mobility and flexibility for handling many types of material — these advantages offered by the Allis-Chalmers HD-6G tractor shovel become increasingly important as the *trend toward outdoor storage gains momentum.*

With 72 net engine hp and long tracks, the HD-6G goes to work even before storage operations start. It clears and levels new areas; excavates, loads or spreads gravel and other surfacing material using a bucket or interchangeable dozer blade.

In the storage yard, the HD-6G stockpiles bulk materials, feeds hoppers and conveyors using a dozer blade, a 1 1/2-yd standard bucket or a

2 1/4-yd light materials bucket. It can also stack palletized material to a height of 9 ft, 10 in. with a lift fork attachment and handle heavy castings with a crane hook. All attachments are quickly interchangeable.

In winter it's "business as usual" when the HD-6G tractor shovel is on the job. This crawler tractor easily clears or loads deep snow.

Take advantage of the latest developments in all-weather preservatives and packaging with this efficient, all-weather material handler. Let your Allis-Chalmers dealer show you how the HD-6G tractor shovel can be your key to efficient outdoor storage. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS

Engineering in Action

When inquiring check 4988 opposite last page

NUCLEAR NOTES

Testing atomic weapons safe as crossing street

According to Marvin D. Martin, divisions head, Weapons engineering Division, University of California Radiation Laboratory, people helping test atomic weapons face "considerably less danger" than average automobile driver or pedestrian crossing busy street. Pointing out safety efforts in atomic weapons development, Martin stated that designers must guard against unintentional detonation as well as guarantee satisfactory performance. To obtain copy of paper 57-SA-32, presented at ASME semi-annual meeting, remit 50c direct to American Society of Mechanical Engineers, Dept. CP, 29 W. 39th St., New York 18, N.Y. Check 4989.

Giant atom-smasher for French research

A four-million electron volt Van de Graaff accelerator, to be used as pulsed injector for proton synchrotron, has been built by High Voltage Engineering Corporation, Burlington, Mass. on special order from the French national atomic research center.

The high voltage column of the giant "atom-smasher" was taken to France by air. Its construction is such that it might have been adversely affected by moisture during an ocean voyage. The pressure tank, base, and other parts of the huge machine will be shipped by ocean freighter.

When completely assembled, the accelerator will weigh more than 40 tons.

AEC ban partially lifted at M. W. Kellogg

The AEC has issued a license which has the effect of partially lifting its May 2, 1957 suspension of operations of the M. W. Kellogg Company of New York involving use of licensed radioisotopes. License permits company's construc-

tion division to resume use of radioisotopes in industrial radiography. Use of radioisotopes by company's nuclear products division continues under suspension, pending completion of AEC investigation of incident which resulted in radioactive contamination at firm's South Houston, Texas, laboratory.

Materials testing reactor — first by industry

Westinghouse Electric Corporation will construct world's first industry-owned nuclear materials testing reactor, according to Gwilym A. Price, Chairman and President. Delayed last year while project was re-evaluated by the company, construction will now proceed at Waltz Mill, Pa.

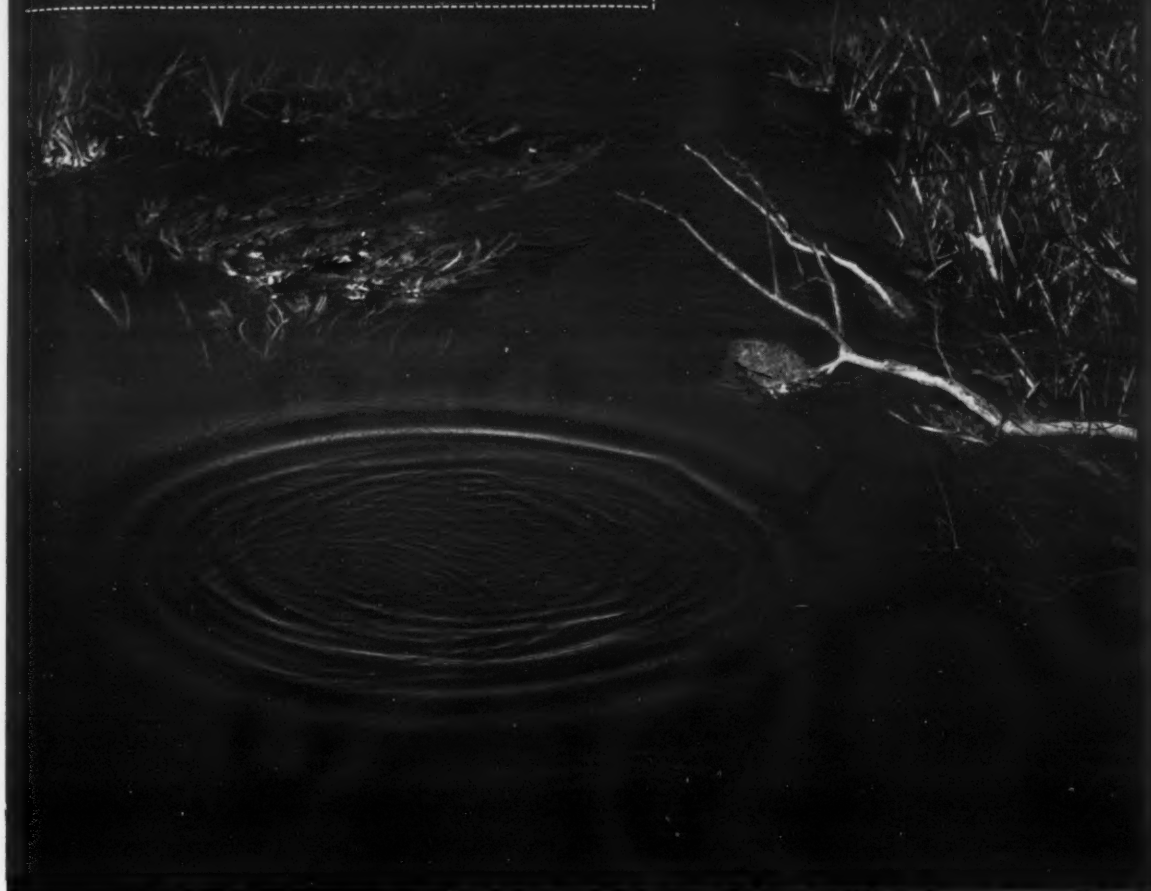
Radioisotopes pay off

Use of radioisotopes is saving industry nearly \$400 million annually and this amount may increase several fold over the next 5 to 10 years. E. Eugene Fowler, deputy director of AEC Division of Civilian Applications, speaking in Chicago, said that for every dollar of federal expenditure on the production and distribution of radioisotopes, \$750 are being returned to the national economy through savings effected in industry, medicine, and agriculture.

Price of plutonium up to \$30/gram

New "guaranteed fair prices" for plutonium have been established by the AEC. For period beginning February 1, 1957 and ending June 30, 1963, price for plutonium lawfully produced under license from AEC, and delivered to AEC, is \$30/gram. Previously guaranteed price for year beginning July 1, 1962 and ending June 30, 1963 was \$12/gram. Total plutonium content is not to be less than 99.5% by weight.

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NUCLEAR NOTES

Isotope Index for 1957 shows supply 30% up

According to isotope index, published by Scientific Equipment Corp., supply of isotope labeled compounds has increased 30% during the last year. Isotopes and isotope labeled compounds are now available from 53 suppliers principally in the US, Canada, and Great Britain.

Recent changes in AEC regulations make it possible to purchase many isotopes and labeled compounds in suitable quantities without a license or government approval. To obtain copy of 100-page 1957 Isotope Index, send \$3.00 to Scientific Equipment Corporation Dept. CP, 23 North Hawthorne Lane, Indianapolis 19, Indiana.

Nuclear standards and divorce laws

Industry's reluctance to invest capital in nuclear installation is due to lack of uniform standards in the field, says Morehouse Patterson, chairman of the Board and president, American Machine and Foundry Company. The field is looked upon as so dangerous, that we can not afford to be without standards, he said. He warned that unless nuclear standards are developed, the confusion will be worse than the divorce laws of the 48 states.

Small business outlook in nuclear field

Nuclear electric generating capacity in the US could reach 227 million kw by 1980, and result in sales of more than \$27 billion in atomic energy equipment for industrial purposes, according to new leaflet issued by Small Business Administration. Opportunities for small business in connection with atomic power will probably involve components, materials, and services related to reactor construction and operation.

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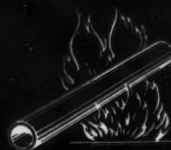
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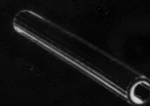
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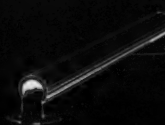
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TEMPERATURES

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SIZE

At B&W—You Can Get — — — The Right Tube For The Job

Pressures, temperatures, oxidation, corrosion resistance, and tube size are important factors the design engineer must consider in specifying tubing for process equipment applications.

For example, one company was faced with a serious problem. Stainless tubing used for conveying methanol and unreacted synthesis gases at 300F and 5000 psi through chloride-bearing bayou water failed due to stress corrosion.

What did they do?

Just what many other companies have done—they called in Mr. Tubes, a B&W Tube Representative. He suggested B&W Croloy 5 as the best material for the job.

The new tubing provided the desired resistance to the particular type of corrosion and satisfactorily met all temperature and pressure requirements. What's more, the new installation proved to be substantially lower in materials costs.

B&W, with its years of experience in all phases of tube requirements, is especially qualified to help you choose the right tubing for any job. To get the most benefit from B&W's long experience in matching tubes to jobs in every respect, call on Mr. Tubes, your nearby B&W Tube Representative. He has helped others, as he can help you, make tubing selection *sure*. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pa.



TA-7010-PP4

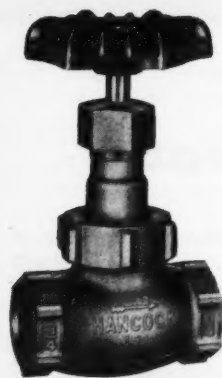
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over the reader's
shoulder

Patents

Dear Editor:

... My major thesis is that the patent situation is unduly complicated and the patent office is overloaded with work because too many patents are allowed in a given small area of technology.

... All statements made in a patent specification should be supported by and identified with factual data that would become part of the patent itself. This requirement could have a twofold result. First, inventors of completely new things who desired early patenting could get specific protection without unduly long experimentation. Second, inventors whose work ends up in a series of patents all relating to the same subject matter would tend towards combining these into one patent ...

An additional feature should be considered that would help to minimize problems resulting from the use of this idea. An inventor falling in the second classification used above would apply for a patent with the stipulation that there would probably be a continuation in part in the near future.

He would then be given a reasonable amount of time to finish the work, say three or four years. During this time the patent office would become well aware of the presence of conflicting applications by others. When this waiting period was over, the patent office would then consider whether or not to issue a patent. Such a patent would be more complete than those issued currently, and would minimize the number of future patents in the same field by the same or other inventors.

When such a patent was issued, it would bear the date of original application plus the three or four years as far as its seventeen-year life was concerned. Patents in the first class would be valid, as at present, for seventeen years

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...Notes and comment
from our readers

from the date of issue. The time of "monopoly", thusly, would be about the same regardless of which route an inventor chose to follow in his patent application.

C. M. NODDINGS
DOW CHEMICAL COMPANY
Midland, Michigan

More on Patents

Dear Sir:

Mr. George E. Frost's article in the May issue of *CHEMICAL PROCESSING* touched lightly on some of the shortcomings of our present Patent Law system. Although he mentions three very glaring defects of the patent system (the time lag between the patent application and issuance of the patent, the elusive tests of invention, and the complexity, expense, and slowness of patent litigation), nothing is said about their rectification. The problem goes far deeper than the author's simple statement, "the problem is largely administrative."

... The problems are basic and relate to the Patent Law itself. A law geared to the activities of the individual inventor in his basement is as out of tune with the present day research and development activities as the horse and buggy is with the modern jet airplane. It is true, of course, that even today the Patent Laws serve a useful purpose as illustrated in the examples cited by the author. It is not valid, however, to point out the indisputable advances this country has made in technology and the sciences and attribute them to the Patent Laws, since there is no standard of comparison. This progress could have been in spite of the Patent Laws rather than because of them.

... The patent applicant could be required to submit a search with his application. Many companies routinely make a search before applying for a patent now. . . .

Turn to page 25



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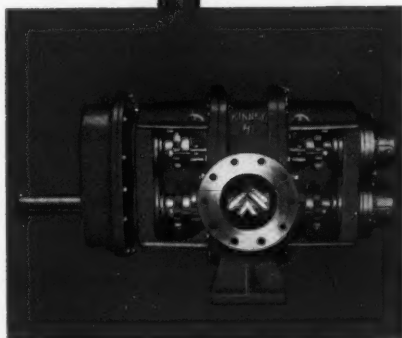
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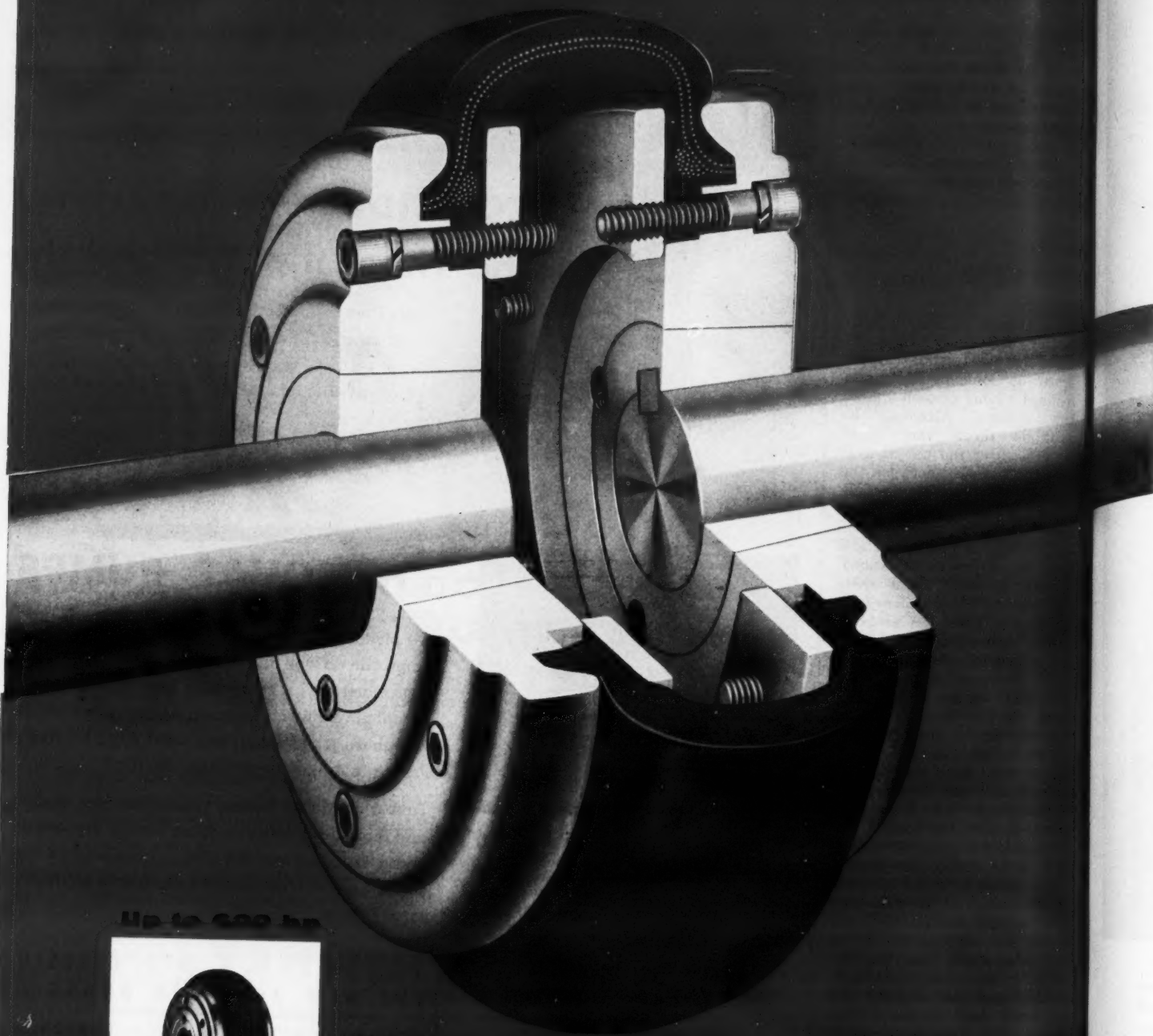
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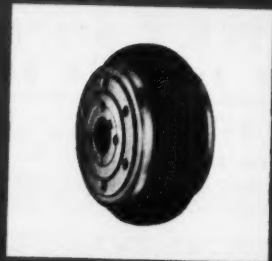
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THIS Coupling "swallows up" misalignment! Its ability to handle multiple displacement is exceeded only in a universal joint. It outperforms the most complex coupling mechanisms—yet it operates with the simplicity—and the dependability—of a modern tire!

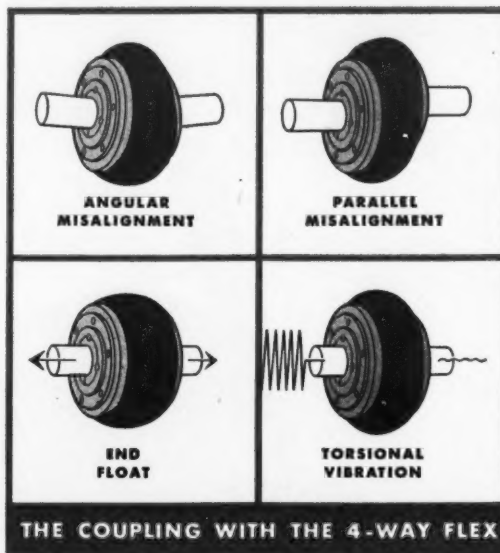
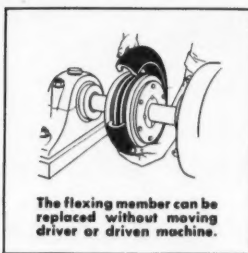
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READER'S SHOULDER

There seems to be something amiss when the scientists that do the inventing never know when they have a patentable invention. The task is indeed much more complex today than it was in the early days of the Patent System. It was easy to see then when there was the "lo and behold" aspect. Today this "lo and behold" becomes less and less obvious in the well-planned, systematic research programs of the large industrial staffs. Perhaps ninety percent or more of present day patents are the result of routine research. This research and development will go on not because of the Patent Law, but because of the intense competitive system. It is this competitive system that must be given credit for our superior technological progress, not the Patent Law.

It was the original idea that seventeen years was the necessary period to give the inventor time to develop manufacture and reap the profits from his invention. There is no question that the ever quickening pace in even the last twenty years has stretched this period into an eternity. There are indeed few patents today that are not obsolete in this period.

The question of invention should be clearly defined and perhaps two types of patents should be issued, one for a period of three years for routine improvement patents, and a second type, basic patents for fundamental discoveries, to run for ten years. This change, along with the speeded up issuance of patents, would go far toward modernizing the system.

... Too often one hears the author's own statement that a letters patent is little more than a ticket to go to court. Also, it is a fact that the validity of a patent too many times depends on which court hears the case. It seems that something as technical as invention should not depend on the whims of a judge. Invention today is an extremely complex vocation and it seems only proper that scientists, not judges or lawyers, should be

Turn to next page

READER'S SHOULDER

the final word. Certainly a committee of experts could be set up to determine validity of patents, infringements, etc., that would cut through the time, expense and delay of the present method of handling these things. Such a committee could well become a part of the Patent Office System. This is certainly logical because Patent Law does not have its roots deep in the Magna Charta, the Constitution or the Bill of Rights, but in the scientific literature, the textbooks and the issued patents. Who are more qualified to rule on these matters than the scientists themselves?

MORRIS J. ROOT
CHICAGO, ILLINOIS

CP's Crystal Ball

Gentlemen:

In an article in December 1953 in *CHEMICAL PROCESSING* (pages 34-37), I predicted that the "passage of body fluids through special filters of specific exchangers for removal of undesirable poisons may be a reality in the near future." This has, indeed, become a reality with the work of two professors of the University of Pennsylvania . . .

. . . articles in *CHEMICAL PROCESSING* do show future trends.

C. CALMON
BIRMINGHAM, NEW JERSEY

The editors of **CHEMICAL PROCESSING** Magazine are always interested in the opinions of our readers, and will publish as many letters as possible in these columns. Address your letters to:

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WILLIAM A. CRICHLEY attended Carnegie Institute of Technology and Robert Morris School of Business. In 1943, he joined Diamond Alkali as Tax Accountant, became Assistant Controller in 1945 and Controller in 1946.

Mr. Crichley is director of The Controllers Institute of America, having been regional vice president (1955-56). He is a member of Pennsylvania Institute of Certified Public Accountants, Tax Advisory Committee of Ohio Chamber of Commerce, and American Institute of Accountants.

FOR THE MANAGEMENT TEAM

chemical
processing

AUGUST 1957

The sudden popularity of electronic computers has resulted in a rush of companies to adopt an electronics program in their business offices. After weighing their own situation, Diamond Alkali decided against use of a computer now for business purposes, and advises others:

Look Before You Leap Into Business Computers

WILLIAM A. CRICHLEY,

Controller,
Diamond Alkali Co.

IN September of 1956, Diamond Alkali decided *not* to obtain a medium scale digital computer for processing business problems. This decision, in this electronic day, may be considered by many to be rather "behind the times." To some, in a day when computers are solving problems in an infinitesimal fraction of the time needed a few years ago, it's difficult to imagine that a major organization with annual sales of \$121 million and fifteen plants could not realize vast savings from use of such equipment.

But, contrary to widespread opinion, use of a computer isn't always the answer to business problems.

The adoption of an office electronics program is dependent upon the aims, problems and "risk philosophy" of each organization. The computer program in most instances has been a business research project; degree of success is relative to the magnitude and complexity of the

problems to be solved. Each organization must evaluate several factors when deciding to embark upon an electronics program. Among these considerations are:

- How much money should our company invest in researching business problem solutions?
- Will our company agree to considerable reorganization — realignment of responsibilities — if found desirable for computer-sake?
- Have we adequate personnel — trained or qualified for training? What is our level of current technical skills?
- Are we highly mechanized today? Are we operating efficiently? Just how much "top cream" is left to chalk up to computer savings? — versus less expensive methods analysis.
- Is our management progressive minded toward electronics? Will they willingly support the program in all respects? Do they

really *want* a computer?

- Is the program economically sound?

Sound economics must be adhered to in computer feasibility study. Dollar justification cannot be merely a figment of imaginative selling. Much has been written about the amazing speeds of computers, true. But, much is also being said of "slow times" once the machine is installed. Misapplication? Poor programming techniques? Or is the machine "slow"?

Considerable thought should be given to preliminary processing times; actual operating results can materialize into a totally unfavorable timing situation, and machine processing time represents sizable money. An hour of large-scale computer time approximates \$385; a medium-scale installation operates at \$105 an hour.

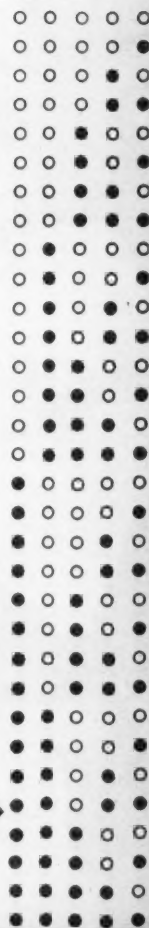
Most study groups will concede that a break-even result is good enough for computer justification. Possibly so, providing that all conversion and related costs have been ap-

praised with stark realism. And this is normally difficult to do, even for the most objective methods man or salesman. So machine process timings are certainly most pertinent to the end results achieved and merit *extreme* estimating care.

Sound economics — for the intangible factors — assume even greater "guesstimating" facility. How does one place a price tag on getting operating statements three or five days earlier? How does one evaluate the dollars received from "exception" reporting? — that is, from reporting only the items that vary substantially from accepted normal situations. (This method cuts down reading and report bulkiness.) Management can surely make decisions faster and with less fear of misinformation. But can management squeeze dol-

Turn to next page

Computer counts from zero to 31 in the binary scale. Zero is zero, one is 1, two is 10, three is 11, four is 100



Not yet time for computers *Starts on page 27*

lars from *more* reports rather than fewer reports?

The story of Diamond's decision . . . and the reasoning leading to that decision . . . is an interesting one.

Diamond is young, progressive minded and quick to adopt modern management techniques. The company during recent years established seven operating divisions; each governs a separate group of products in most all phases.

The divisionalization concepts provoked considerable meshing problems. A modified system of decentralization keeps property and cost accounting at the plant level, while plant invoicing, cash accounting and accounts payable are centralized. Applied research is divisionalized, whereas purchasing and engineering are centralized services.

In 1953, the company engaged the special services section of Price Waterhouse & Company, their public accountants, to make a paper-work survey throughout Diamond. The organization was reeling under mushrooming paper work and sought to halt rising clerical costs. The survey pointed up a need for, first, more extensive utilization of machine accounting and, second, an integrated data processing system for sales orders.

Midway through the development of the added machine accounting installations (inventories, costs, property accounting) and pilot testing a very modern system of integrated data processing, Diamond became actively engaged in appraising electronics. In July, 1955, at the outset of a computer feasibility study, the Diamond organization was stabilizing new procedures for additional divisional information and for new acquisitions.

Input data were given top priority as an essential build-

ing block for future planning in EDP. Electronics had to stand on its own; if extended machine accounting could accomplish similar results with markedly fewer dollars, then machine accounting would be used in preference.

In pursuing a feasibility study, Diamond could locate no one sizable "bread'n butter" application. Monthly paper work volumes were moderate: 12,000 invoices (50% centralized) and 2,000 purchase orders. Only 135 accounting personnel out of 5,800 total employees are centralized. Diamond's problem was basically a variety of industrial accounting jobs, small in volume but complex in nature. Work efficiency was considered above average in measurement with other organizations. Also, "intangible savings" proved evasive; few supervisors volunteered to place dollar signs on potential savings for their area of the business. This was found, later, to be rather common computer practice.

Also, as the study developed, various medium-scale equipment inadequacies and inequalities became apparent. Magnetic tape storage appeared to be, at least for our purposes, slow, costly and to have certain inflexibilities. Medium scale machines had not been expressly engineered for tape operation and as a result suffered design incapacities. Inexpensive random storage devices were not available — even though mass fast-access storage was commonly sought. Up-dating and multiple distributions for multi-division accounting require thousands of storage "buckets." Card and paper tape input devices, for detail data processing volumes, were slow considering limited drum capacities. High speed printers were available; but not for the moderate-sized user. The expensive counter capaci-

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◀ **COMMUNICATIONS HEADQUARTERS** — the central order section of Diamond Alkali, is located in the Company's general headquarters in Cleveland. Here, for each order, is prepared an authority-to-ship tape which is wired to a plant; a tape for billing — held at the office; and a special tape for multiple shipment orders. In addition to processing orders, Diamond is using its tapes for fast statistical business analyses





After a century or so of "favoring" organics, the pendulum swings back again to reveal —

NEW HORIZONS for INORGANIC CHEMICALS

BY I. H. MUNRO, President
Solvay Process Division
Allied Chemical & Dye Corporation
New York, New York

Within the past few years, a new type of inorganic technology has emerged. It seems that ever since the discovery in 1828 that organic compounds could be synthesized, developments in organic chemistry have eclipsed those in inorganic. More recently, however, the cycle appears to be swinging back again. Today we are hearing much about "atomic power," "inorganic fuels for rockets," and "magic metals."

Take fuels, for example. With the minor exception of hydroelectric power, industry's power requirements are supplied by organic fuels. With their approaching decline, alternatives must be found. It appears that nuclear power will be our major source. Uranium and thorium, both inorganics, will take a position among the most vital of the elements.

Great Britain is already far along in this development. Their Calder Hall nuclear power station, the world's first, has been feeding something less than 90,000 kw into Britain's electric system for a year. A second unit, doubling the present capacity,

ISSAC H. MUNRO was made president of Solvay Process Division of Allied Chemical and Dye Corporation in February of this year. Previously he was vice president and assistant to executive vice president. Between 1951 and 1953, Munro was chief engineer for the division. He joined Solvay Process' Syracuse, N.Y., office in 1935 after he graduated with a Masters degree in chemical engineering from MIT. He received his AB degree from Colgate University. "Ike" Munro lives at Port Washington, Long Island, with his wife and two children. He is a member of the AIChE.

will be plugged in next year. Ten more are planned, so that by 1975, annual generation of electricity by nuclear power will equal that made from forty million tons of coal.

In our country, prototype power plants are the only ones in operation. Larger ones are on the design boards. At present, uranium is the fuel, but thorium may be an economical source of fissionable uranium if the breeder reactor is developed.

What impact will peace-time uses of nuclear energy have on the inorganic chemical industry? We can't say with certainty. We do know that in addition to the fissionable materials, a number of metals and inorganics have recently become very important.

For example, there's zirconium. Here's a metal that was relatively

unknown a few years ago, even though its ores are more abundant than those of copper or nickel. Now, zirconium holds first place for structural metals in nuclear reactors. It absorbs few neutrons, is strong, high-melting, and has excellent corrosion resistance. It is also finding use in surgery and in industry.

Hafnium, which is closely related to zirconium, has a very high capacity for absorbing neutrons, which also makes it of value to nuclear equipment designers.

Titanium is another new metal. Although used for years in the form of its oxides, the metal itself has been rare. Since the dawn of the "jet age," this metal has become increasingly important because of its unique combination of light weight, high

strength, and corrosion resistance. The element is not rare but is hard to extract. Development of an economical recovery process will continue until success is attained.

Inorganic chemicals for power, such as those based on lithium or boron, are being tested by the US Air Force. Organo-borons are of interest because of their light weight and high energy, which makes them especially important as fuel ingredients for rockets, guided missiles, and supersonic aircraft. They will also be used as intermediates.

This should increase the demand for borax from the present 900 thousand tons per year to 2½ million tons per year by 1965. Since our borax deposits are richest in the world, we will have sufficient raw materials to meet this demand.

Lithium chemicals have also experienced a sensational growth. The chemical processing industries use them as a reducing agent in organic reactions, polymerization catalysts, raw material for metal hydrides and borohydrides, bleaches, gas absorption, refrigeration fluids, and propellants. Production in 1953 is estimated at 5 million pounds. This could increase to 30 million pounds by 1960.

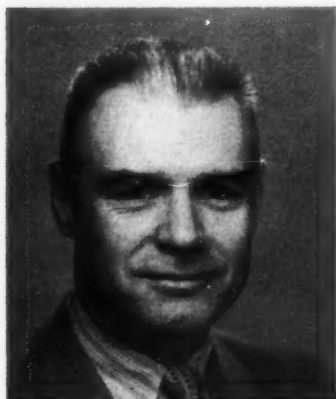
Other examples are germanium

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Tariffs Police Chemical Markets

Dr. Lewis E. Lloyd

IF United States tariffs are removed, or in fact are set too low, our industry will migrate to other countries. Not overnight, not all at once; but as surely as water runs downhill, the new plants will be built where low wage rates are avail-



DR. LEWIS E. LLOYD is Economist and Head of Business Research for The Dow Chemical Company. He is author of the recent book, "Tariffs: The Case for Protection." Dr. Lloyd belongs to many organizations concerned with tariffs, business, economics, and the chemical industry. He is Regional Vice President of the American Tariff League and has served on a committee of the Hoover Commission.

Dr. Lloyd has training in both economics and chemistry, culminating in the degree of Doctor of Science from the University of Michigan. He has taught economics and chemistry and done chemical research work. In addition to his recent book on tariffs, Dr. Lloyd has had a number of articles published in the field of distillation as well as on other subjects — ranging from forecasting to figure skating.

able. This will happen because the American producer will not be able to compete profitably, even in his home market. This means exportation of jobs, for it will bring unemployment and stagnation of industrial growth in this country.

Is free trade for the United States really that hazardous? Can we not outproduce the world and outcompete everybody? Does the fast-growing chemical industry, for example, really need protection from foreign competition? These important questions cannot be answered on the basis of platitudes. We shall need to get the facts and relate them to the everyday problems of the actual market place. Moreover, we must watch the semantics problem. Our logic will surely lead us astray if we use words loosely.

For example, take the word "protection." What does it really mean? Many of the arguments for free trade (or freer trade) are made to seem plausible by the simple expedient of using the words *embargo*, *protection*, and *tariffs* interchangeably. These words, however, are not synonymous. An embargo or a quota is a quantitative restriction on imports. Protection, as used in foreign trade discussions, means to shield from competition. A tariff, on the other hand, is merely a tax on imports. It may or may not restrict trade; it may or may not shield producers from competition, depending on the level of the tariff and on many other factors. We shall want to keep in mind the difference in the meaning of these words as we examine the trade question.

In our quest for the facts, let

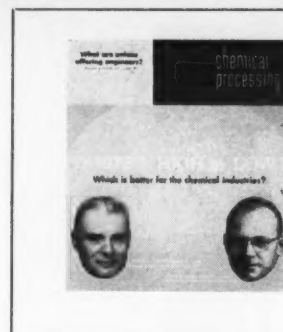
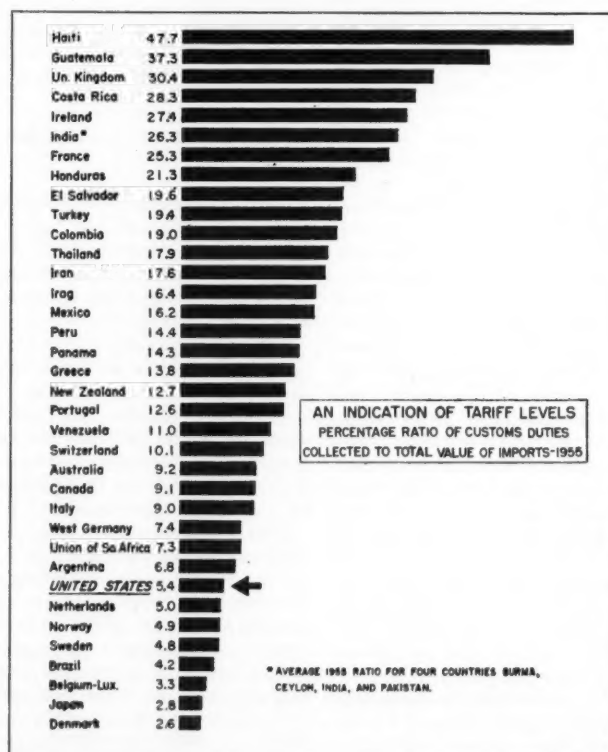
us first review the present situation and recent trends in our trade policy. Many people have the impression that the United States is a high-tariff country. What are the facts? The records show that in the past 20 years we have reduced our tariffs considerably. The ratio of tariffs collected to dollar imports shows a reduction of more than 70% since 1934. Some of this reduction, however, results from price rises on products which have a specific duty instead of an *ad valorem* rate. Taking a different approach, the Tariff Commission

has made studies which show that actual tariff rates on particular products have had an average reduction of 50% between 1934 and 1953. Further reductions have been made on many products since then.

US Tariffs are Low Now

A comparison with other countries indicates that we are now one of the low tariff rate countries of the world (see Fig 1). For the United States, the duties collected equal only 5% of

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TARIFFS

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Have we gone too far in cutting tariffs, threatening the very existence of vital industries in this country? . . . or does the interest of this country lie in a liberal tariff structure?

Both sides of this crucial question are explored here by two leading authorities.

The Case for a Liberal Trade Policy

SIDNEY A. SWENSRUD

THE danger always exists that those who express views in favor of a liberal trade policy may be accused of being out-and-out free traders who think all tariff or other import restrictions ought to be immediately and completely eliminated. I am not in that category, for I do not believe such a program would be either sound or realistic.

I do believe, however, that our country in its present stage of development has a very great interest in helping to establish more liberal trade policies for private trade throughout the free world — particularly in view of the enormous interest we now have in the sale of our products and services in foreign markets, an export business which

amounts to more than 23 billion dollars a year and involves the welfare of millions of American workers and investors.

We have come a long way from the days when the United States was an undeveloped debtor nation and our primary economic concern was to utilize and develop our own resources to the maximum advantage and build up our youthful industries to gives us a strong, well-balanced economy. Under those conditions, a policy of applying high tariff rates to various products made a good deal of sense.

Today we are no longer in that position. Instead of a debtor nation, we are now the largest creditor nation, and few of our industries can any longer claim

special protection as infants. Our export business, as already indicated, has become enormous, and in contrast to our imports — which consist largely of raw materials — the exports are mainly manufactured products.

It hardly seems necessary to dwell on the fact that our ability to export depends directly upon the amount of our imports, since except for dollar loans or investments abroad (or gifts), our customers can get dollars only by selling to us.

This inexorable fact seems a hard one for many people to grasp. Some businessmen, for example, still seem to have the mistaken notion that US manufacturers can go on selling to other countries without there being any relation between exports and imports.

We must not fall into the error, however, of thinking of imports as a sort of necessary evil to enable us to continue exporting. The fact is that there are many raw materials and other things we need from abroad if we are to continue our high standard of living, and we are fortunate to be able to get them from other countries in exchange for products which we make.

We are no longer a net exporter of raw materials but instead are a net importer, and every indication is that this tendency will accelerate as our needs increase and our sources tend, in many cases, either to decline or to increase less rapidly than requirements.

The accompanying table shows the extent to which we were dependent, in 1950, for a number of raw materials. Today, the percentages in most cases would have increased.

The task of freeing up the channels of world trade has not been easy. The depression of the 30's and World War II had let in most countries to a tremendous complex of tariffs, quotas, exchange restrictions and the like,

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SIDNEY A. SWENSRUD is Chairman of the Committee for a National Trade Policy.¹ He was Chairman of the Board of Gulf Oil Corporation until his retirement April 23, 1957, a position he had held since 1953. Previously he was president of Gulf and before that held a number of executive positions at Standard Oil Co. (Ohio).

Mr. Swensrud received a BS degree from the University of Minnesota and an MBA degree from the Harvard Graduate School of Business Administration. Among other organizations, he is a member of the Foreign Policy Association and is on the executive committee of the U. S. Council of the International Chamber of Commerce.

¹The Committee for a National Trade Policy is an association organized in 1953 by a group of businessmen to make known to the public and to Congress the views of those who believe in working for an expanded world trade.

IMPORTANT US IMPORTS

Net Imports as %
of Domestic Consumption

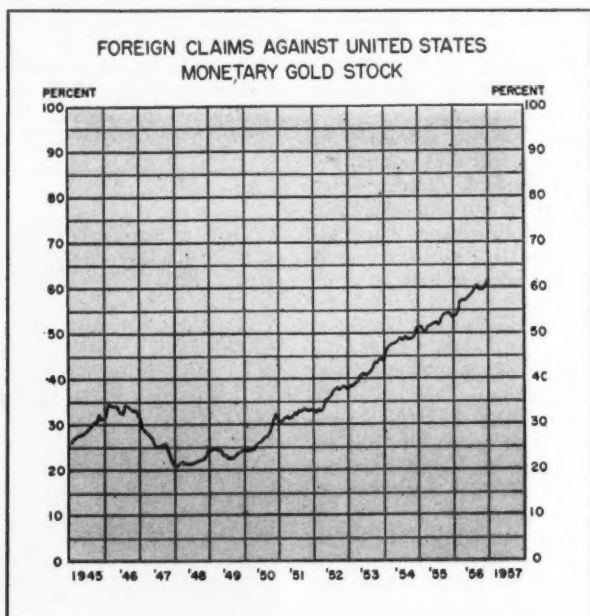
Coffee	100	Cobalt	78
Diamonds (Industrial)	100	Bauxite	58
Tea	100	Antimony	43
Asbestos	95	Lead	37
Nickel	92	Fluorspar	35
Chromite	89	Zinc	33
Tin	82	Gypsum	28
Manganese	81	Copper	17
Tungsten	80	Petroleum	6
Wool (Apparel)	79	Iron Ore	5

total imports and only 12% of the imports carrying duties, i.e., excluding items on the free list. (These are based on a study made in 1955.)

In addition to the fact that our tariff rates are lower than most other countries, we make little use of quantitative import restrictions. Other countries make extensive use of quotas, licenses, and currency restrictions. These are much more restrictive to trade than are tariffs, and very often are applied primarily against imports from the United States. Throughout the rest of

products we have given to foreign nations.

The problem is not that there is a shortage of dollars abroad, but rather that many countries choose to use the dollars they have for uses other than the purchases of United States merchandise. Foreign nations hoard dollars to stabilize their own currency or for use as exchange with other countries. In the past 10 years, foreign nations have increased their dollar holdings to the point where they now have claims on almost two-thirds of our total gold reserve.



the free world, trade barriers are higher today than they were prior to World War II and prior to our Trade Agreements Act, which was designed to reduce barriers against American exports. The United States has offered considerable leadership in the reduction of trade barriers in the past 20 years, but we have had little following.

We are told that foreign countries set up these trade restrictions because of the dollar gap. However, the large dollar gap existed, and in fact could exist, only because we gave dollars to nations through our foreign aid program. The dollar gap is merely an accounting figure which tells us just how much of our

You see, foreign nationals may demand gold for dollars, even though you and I can't. Fig. 2 shows the steady growth of foreign claims against the gold of our money credit base. As a matter of fact, between the amount of imports we have had and the dollars we have given away, we are now in a very vulnerable position with respect to our money credit system. If at any time, for whatever reason, foreign nationals began to prefer gold to our dollars, we could end up with a financial crisis the likes of which this country has not seen in half a century.

In discussing this subject, Economist E. C. Harwood concludes that "... the fact that so

much was transferred in the form of short-term claims on US gold presumably reflects relatively higher prices in the United States and a resulting preference of foreigners for gold or claims on gold rather than for US goods."

Foreign Trade Less Important

We see, then, that the dollar gap is not a prime deterrent to trade. Moreover, the history of our foreign commerce gives part of the answer why. Our foreign trade has been of decreasing importance throughout the years. In 1800, foreign trade represented 12% of our gross national product; in 1875 it represented only about 6%; and today it represents only about 3%. The decreasing importance of foreign trade for the United States and for the world is shown in Fig 3.

This is a natural change because, as science and technology have advanced, we have become less dependent upon nature. We now manufacture nylon, Orlon and Dacron instead of importing silk from Japan. We make synthetic mica and synthetic rubber. We make our own drugs and dyes. We are rapidly replacing hardwood with plastics. Chemicals, plastics, and fibers can be made from coal, petroleum, wood, or other plant fibers, whichever is most available. This does much to free nations from the quirks of nature in the distribution of raw materials.

What about the future? Will foreign trade further decrease in importance? What about the clamor for greatly increased foreign trade? When we examine why any nation may wish or need foreign trade, we find there are four economic reasons:

1. If a nation is lacking in certain essential raw materials, it will need to import them.
2. If a nation find its climate and soil conditions unsuited for growing certain animal or plant life which it needs, it will want to import them. Conversely, if it has an overabundance of suitable soil or climate for certain products, it can profitably sell them in world markets.
3. Wherever a country is too

small to represent by itself a mass market, it will need to trade, for only with a mass market can the benefits of low-cost mass production be obtained.

4. A nation may desire foreign trade if its technology, ingenuity, and inventiveness lag behind.

Applying these to the United States, we find that there are certain essential raw materials which we must import. A number of natural products, such as bananas, coffee, cocoa, tea, rubber, spices, and the like, which grow in tropical countries, are also needed. We import large quantities of these materials, most of them duty-free. Most of our raw materials and basic commodities are on the free list.

On the other hand, we do not need to trade to get a mass market or because we lack in technology. It is obvious from this that those who propose increasing our imports so we can export more are getting the cart before the horse. Basically, we merely need to export enough to pay for desirable imports.

From this we see that we do indeed have a need for foreign trade, and we have noted the principles upon which to decide how much foreign trade is needed. We should next turn our attention to how this trade is to be conducted. Those who favor tariffs are not opposed to trade, but believe that the interests of this country will be best served if tariffs are used to insure fair competition in the American market.

What, then, is the meaning of "fair competition?" Simply stated, it merely means that competition is not fair unless the rules are the same for the contestants; unless the arbitrary restrictions are similar for competing producers. Fair competition is so fundamental to our economic system and way of life that we have laws to prevent monopoly and assure competition between domestic producers. To define the meaning of fair competition more fully, we need to examine the free trade theory.

The free trade theory states that in the absence of trade barriers each nation will produce that for which it is most efficient,

and hence all nations will maximize their production and thereby have the highest possible standard of living. The theory assumes international division of labor, based on natural advantage only (no artificial man-made advantages or restrictions). It is this theory which the free trader believes, and which others question.

Let us examine the free trade theory to see if it really works in the everyday world of sovereign nations — to see if the assumptions on which the theory rests match the world situation. At least eight conditions must be met if the advantages proposed by the free trade theory are to be realized:

1. Taxes must be comparable. If the tax burden placed against production units in different countries is not the same, then factors which have nothing to do with productive efficiencies may determine where the production takes place.
2. A universal currency would be needed. Otherwise, temporary commercial advantage could be obtained through manipulation of currency.
3. Business laws regulating commerce and the free market must be uniform. As long as there are different rules in different countries, or different standards of enforcement, there is no assurance that the most efficient will succeed.
4. All nations would need to have similar business ethics.
5. Uniform wage rates should exist throughout the world. If wages differ substantially in various countries, then the location of production will be influenced by wage rates rather than by efficiency and natural productivity.
6. Maximum mobility of labor is required. If the selling price of manufactured products is to be set in free international markets, then wages must also be set by free international competition between labor. This would mean elimination of all immigration laws.
7. Every assurance of freedom from war should be given.

No League of Nations or United Nations, which includes the concept of sovereign nations, can offer sufficient assurance of peace to permit nations to forget about the question of self-sufficiency in relation to national defense.

8. Finally, if free trade is to work on a world basis, it means that we must have a world government. Only a world government could set uniform taxes, establish and administer uniform laws, furnish a single currency, and assure freedom from war.

If these eight conditions are not fulfilled, then free trade on a world basis will result in the allocation of land, labor, and capital on the basis of political factors — on the basis of unnatural advantages — rather than on the basis of natural advantage and economic productivity.

We Must Maintain Our Defenses

The fact that these eight conditions are not fulfilled is evident to anyone. For example, far from being outlawed, war is an ever-present danger. We must maintain our defenses. Unfortunately, many free trade advocates do not seem to realize that the only satisfactory way for us to maintain a strong national defense is to maintain a strong and broadly diversified industrial economy.

From war to war, most of the advances in military equipment have been based upon the research and development done by private industry between wars. We cannot satisfactorily subsidize our defense needs because we don't know what the defense needs and military requirements in the next war will be. This in itself is adequate reason to make sure that our capital and know-how do not have to migrate from this country in order to be competitive in the American market.

Free Trade Lowers Wages

Another very unnatural restriction in the present-day world of sovereign nations is the quota on labor. Many years ago our Government decided to put restrictive quotas on the impor-

tation of people. They believed that our way of life could best be maintained and our living standard most rapidly improved by restricting free immigration. If the free traders really believe their theory, they would clamor for removal of this highly restrictive quota.

Our immigration quotas prevent the importation of cheap labor. Unrestricted immigration would tend to encourage the importation of cheap foreign labor, which, in turn, would have a depressing effect on our wage levels and thus make us more competitive. I don't believe the average American would welcome a reduction in his wage or salary. On the other hand, importation of the products of cheap foreign labor without adequate tariffs will have the same sort of depressing effect upon wage standards in this country.

Thus, the very great difference in labor costs between major industrial countries results in an important divergence between free trade theory and practice. Repeated studies show that unit labor rates, including all fringe

benefits, are much lower in foreign countries. In industrial Europe they run from 1/3 to 1/5 of our labor rates, and in Japan about 1/10.

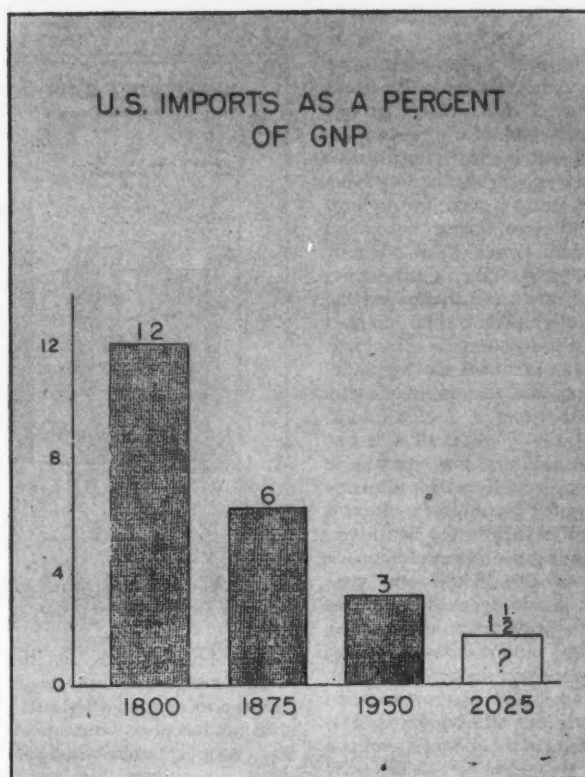
The average wage rate, even in the highest-wage country in Europe, is less than our legal minimum wage. We do not permit production to move in interstate commerce in this country unless the producer is paying a wage rate of a dollar an hour or more. Why should we permit commerce from foreign producers to enter the country and cross state lines when their wage rates are well below our minimum wage rates?

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READER COMMENTS WELCOMED

Perhaps you have some opinions on this vital subject of tariffs, along with some well-thought-out ideas. If so, we would like to hear from you. Write to:

John C. Vaaler
Editor
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111 E. Delaware Place
Chicago 11, Illinois



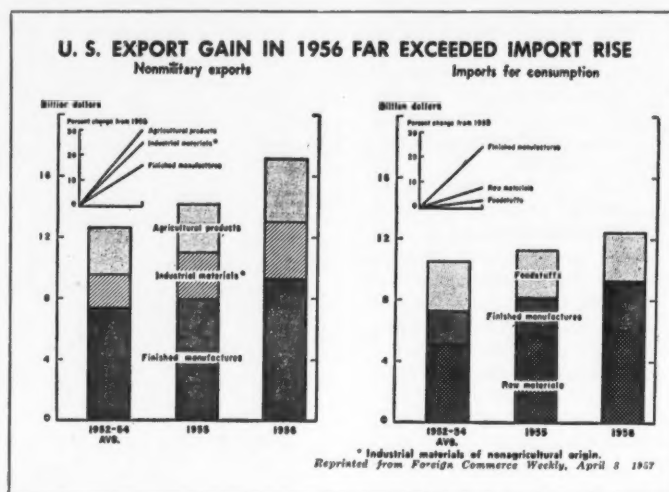
stifling foreign trade and limiting its freedom. After the War our Government and others recognized the need of reversing this trend, and it is gratifying to note the great progress that has been made in this regard throughout most of the free world.

We should not think of our liberal trade policies as being designed more for the benefit of other nations than our own. I prefer to judge them on the basis of our own business and economic interest, and they are well able to meet that test.

For about 25 years now it has been the policy of our country to encourage expansion of international trade. The high tariff rates of the Hawley-Smoot Bill, enacted under the depression psychology of 1930, were soon recognized as adding nothing to our national prosperity. They resulted in other nations taking retaliatory measures which gravely reduced our exports. It was doubtless true then, as it is now, that more people can be injured by reductions in the production and sale of things for export than are benefited by reduced imports.

Cordell Hull, as Secretary of State, was the great sponsor of the reciprocal trade idea, which was first incorporated into our laws in the Trade Agreements legislation in 1934. The idea was simply that before we reduce our tariff rates or other restrictions on imports, we should insist on getting other countries to agree to relax their restrictions against us. Therefore, the idea was developed of having Congress give leeway to the Administrative arm of the Government, within the limits set by Congress, in which it could reduce tariff rates or ease other restrictions, depending on how much reciprocal concessions could be obtained from other nations in return.

This, of course, is just good Yankee trading, and ever since 1934 both Democratic and Republican Administrations and Congresses have supported this principle. There is no question but that the practice of securing gradual reductions by many countries in their trade barriers has helped enormously to bring about the great increases that



have occurred in our foreign trade since the end of World War II.

Most businessmen, we believe, have come increasingly to understand and agree with this general philosophy. But relatively few people, even though they hold such a view, take any active position in the matter before Congress or in other ways. In fact, many businessmen who benefit directly from foreign sales do not necessarily connect up the volume of such sales with our general trade policy. In other words, they do not stop to think that the amount of goods or services they are able to sell abroad is dependent, among other things, upon the extent of our country's imports from other nations.

In contrast to this, however, businessmen who fear that they may be adversely affected by imports are often quick to demand protection. There are, in fact, cases of businessmen, whose exports are many times as great as the part of their business which may be affected by imports, who take extremely strong positions in demanding restrictions. They apparently do not realize that their net overall interest probably lies in a liberal trade policy. Perhaps, however, it is only human nature to want the best of both worlds!

Low Tariffs Help Chemical Industry

The chemical industry, whose

exports of well over a billion dollars a year are several times as great as chemical imports, may be a case in point, for it is generally regarded as an industry demanding high protective tariffs. This undoubtedly dates back to the time when much of its business was in the infant industry class and included many items which were important to our national security. Undoubtedly, as to various individual items, national defense considerations or competitive import problems are still involved. Looking at the industry as a whole, however, and considering the magnitude of its export business and the high ratio thereof to chemical imports, it would seem that its overall net interest may well lie on the side of a generally liberal trade policy.

Arguments for higher tariffs or other import restrictions are usually based on either or both of two contentions. One is that foreign wage levels are lower than ours and that, for this reason, foreign products if not handicapped would enjoy an unfair advantage in the American market. The other is that national defense requires that certain domestic products or industries be protected. Both arguments have merit in some individual cases.

Certainly we do not want our national defense to be weakened and, in general, domestic industries should not have to suffer because of our trade program. It

is for these reasons that our trade legislation contains special provisions to take care of situations where it appears that undesirable injury would otherwise occur. The problem, however, is rather one of evaluating the arguments in relation to the overall national interest, having in mind that reductions in imports must inevitably result in reduced exports as well. There is also the consumer's interest to consider.

Wage Rates Not Sufficient Measure

As for comparative wage rates in the US and elsewhere, hourly wage rates *per se* are not a sufficient measure. Productivity must also be considered. In general, the reason why wage rates in the US are higher than elsewhere is because we do produce so much more per unit of labor. Apart from wages, the unit costs of raw materials, of capital and management, must also be considered.

From a national standpoint, the fundamental economic question in all foreign trade is whether we can get something we want more advantageously by making it ourselves or by making something else and trading for it. And as in all trading operations, the more we can get for what we give, within reason, the better off we are.

Many people do not realize the magnitude and importance of the US export trade, which is greater than that of any other nation. Nearly every American industry which produces movable goods exports some of its products. In 1955, total US exports of goods and services (exclusive of grants of military goods) amounted to almost \$20 billion, and in 1956 this rose to over \$23 billion. A high proportion of our exports consists of manufactured goods. Items of particular importance are chemicals; construction and mining equipment; textile, agricultural and other kinds of machinery; automobiles, trucks, tractors, buses, and aircraft. About 11% of our coal production in 1955 was exported. Agricultural exports, although constituting only about 1/5 of our total ex-

ports, are extremely important to this industry. It is estimated that the product of over 40 million acres of farm land goes into foreign sales and accounts for about 1/3 of all farm cash income.

Export Business Means Jobs

Naturally this export business means jobs and income for a great many people. The latest specific figures available are for 1952. Even at that time, when exports were far below present levels, some 3,100,000 people were directly employed in the production of export goods. Another 1,250,000 persons were working on the further processing and handling of imported materials. This makes a total of more than 4,300,000 people employed in foreign trade in 1952. The total would now be much greater.

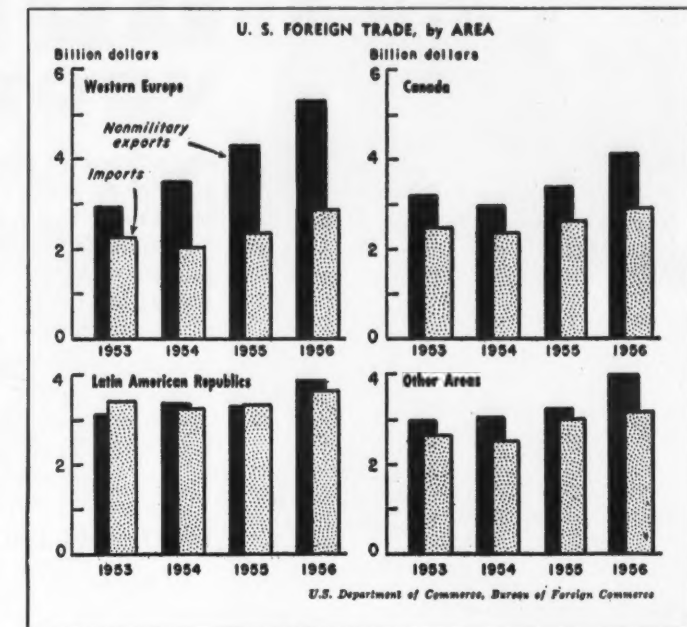
By any measure this is a huge business. That is why it is important that not only Congressmen and Government officials but industrial leaders, as well, should look at our trade policies in terms of their overall effect on both imports and exports.

The consumer's interest should be considered as well. It is no longer sufficient for businessmen to ignore or shrug off all responsibility for the effect on exports while battling to restrict some competitive import. Someone has suggested it might be a healthy exercise if anyone objecting to a particular import were required to specify what export he would like to have eliminated.

Need For Flexibility

When it comes to our foreign trade laws, several things seem clear to me. One is the inherent need of providing a "trading position" if we are to get other countries to relax restrictive measures against our imports in exchange for any concessions we make to them. It seems to me no longer feasible or possible for Congress to try to set individual, inflexible tariff rates for each and every one of the thousands of items now involved in our foreign trade.

For many decades now we have followed the wise policy of



not having different tariff rates apply to different nations. In other words, if we agree with Country A to establish a particular tariff rate on a certain commodity, that rate applies equally to imports from every country with whom we do business. This is known as the Most Favored Nation Policy (which perhaps might be better called the No Favorite Nation Policy).

Except for certain special Customs Unions or Empire Preference arrangements, most of the other leading nations of the world have similar policies. Under this system it becomes important that when one nation makes a concession to another, it be in a position to get as full a *quid pro quo* as possible from all the others.

For this and other reasons, practically all of the leading trading nations of the free world — some 35 in all — have evolved a procedure for working out multilateral agreements through a mechanism under which they can all get together simultaneously at specified times to work on the agreements. This is done through what is called the General Agreement on Tariffs and Trade — sometimes referred to as the GATT.

In our case, before negotiations affecting any US item are entered

into, hearings are held by our Government with the domestic industries involved so that our negotiators will be as thoroughly informed as possible as to our interests. What we agree to in such sessions in the way of tariff changes or other provisions must always, of course, be within the limits laid down by the Congress.

The purpose and procedures of the GATT have not been understood by many people and this is perhaps inevitable in a complicated matter of this kind. Some of the opponents of a liberal trade policy, however, have tried to discredit the GATT by suggesting that it is some kind of sinister sell-out to the internationalists and is really designed to benefit other countries at our expense. They refuse to take cognizance of or give credit to the multilateral agreements for the vast increase that has occurred in our exports and in all foreign trade. They cannot explain how, in any other way, we could have induced other nations to reduce their trade barriers against us as effectively as we have done under this method.

Passage of Bill H. R. 6630 Urged

One shortcoming of the GATT has been its lack of a permanent administrative machinery to

watch over the agreements and keep up with current problems. The US Congress is now considering a Bill, H. R. 6630, which would authorize the President to accept membership by the US in such an administrative agency, to be called the "Organization for Trade Co-operation" (OTC) and which would act as the administrative arm for the GATT.

Such action by the US has been strongly urged by the President, the Secretary of Commerce and most other members of the Cabinet, and by a great many other individuals and organizations who have studied this problem. Our Government believes that the OTC is particularly desirable as an additional means of making sure that we are getting all of the advantages for our US trade to which we are entitled under our multilateral trade agreements.

An additional need for OTC has been created by the recent treaty signed by six Western European nations (France, Italy, Western Germany, Belgium, Holland, and Luxembourg) for a common market; that is, a customs union area comprising most of Western Europe which eventually will be free of all tariff and other trade barriers.

This action marks a great step forward in recognition of the advantages of freeing up trade among nations. Here are six nations which have become convinced that their trade barriers against each other are doing all of them more harm than good. After years of effort on the part of a few men of great perseverance they have finally reached the point of signing treaties which, when and if ratified by their parliaments, will initiate the greatest measure against trade barriers that has occurred since our founding fathers wisely wrote into the US Constitution that no state of our Union could ever enact a trade barrier against another. This provision has deservedly been given much of the credit for our great economic development.

Customs Unions of the type just described are permitted under the GATT, but many adjustments will be required to assure

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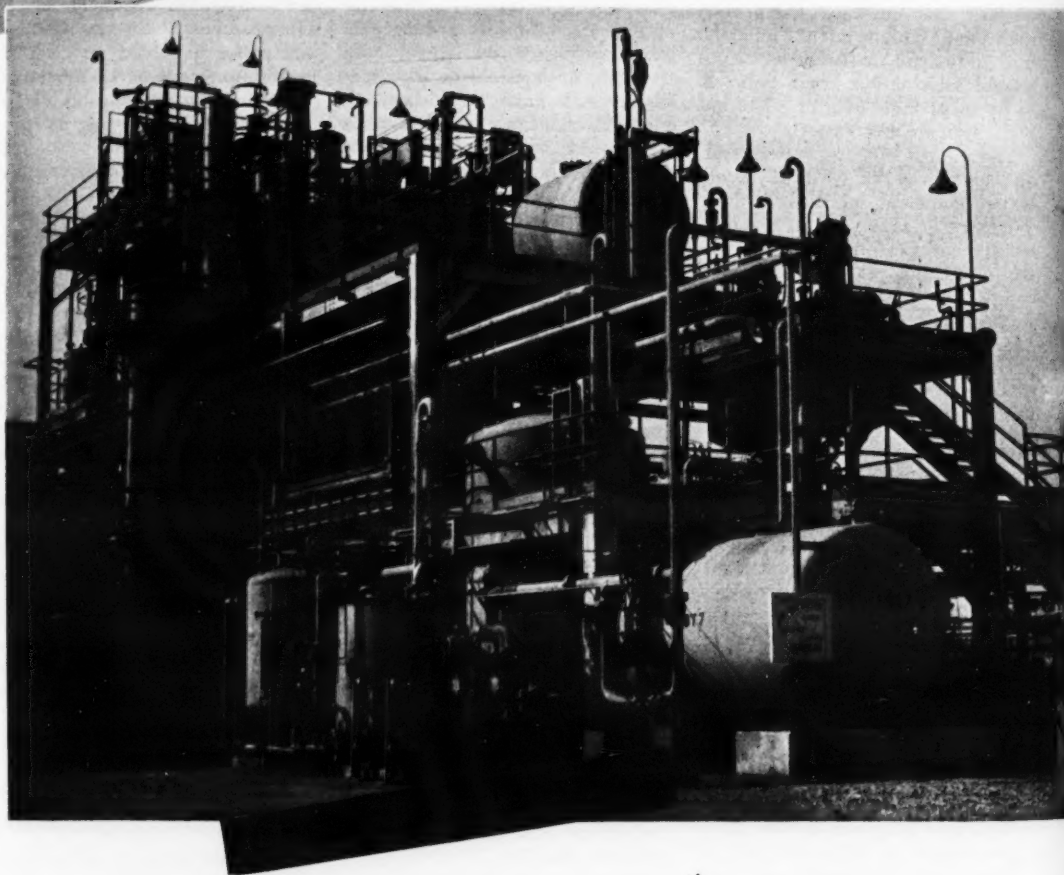
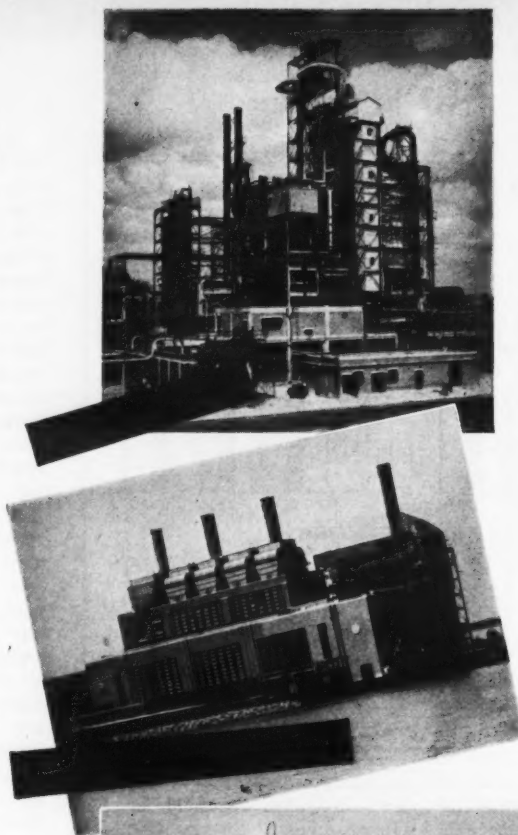
that exports from the US and other countries to the common market area will not be discriminated against. In the working out of complicated matters of this kind the existence of a going agency such as OTC should be very helpful.

The new OTC Bill now before Congress contains a number of provisions designed to make clear that our representatives on OTC can never go beyond the authority laid down by Congress and neither can our Government accept any amendment to the OTC without the specific approval of Congress. These and other provisions should serve to allay the apprehensions of those who feared that somehow accepting membership in the OTC might be a step toward delegating control over our foreign trade to some new international body.

In the debate over OTC this year, and in the renewal of the Trade Agreements Act when it expires next year, the basic question will be whether we shall have a liberal trade policy that recognizes the relationship between imports and exports or whether we shall go back toward the high-protectionist philosophy of the Hawley-Smoot days.

Some influential and powerful people would like to follow this latter course in the interest of shutting out competition for products they make. I believe, however, that the great majority of businessmen and the public, and I think Congressmen as well, favor a policy of gradually lessening the barriers against world trade. They favor a reasonable play of competition, giving the consumer as wide a choice in what he buys as is possible.

The more particular question will be whether Congress will continue the present method of dealing with trade problems. This involves delegating to the administrative branch of the Government the right and duty of trading out specific tariff rates and other provisions. This would be done within the limits laid down by Congress, under some kind of trading mechanism such as that provided by the GATT and the OTC.



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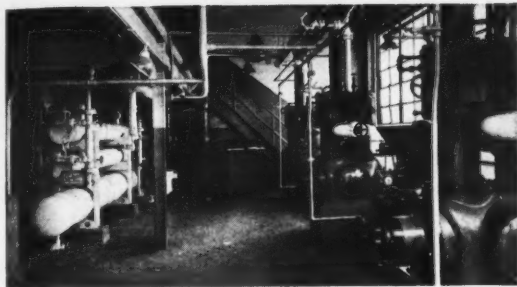
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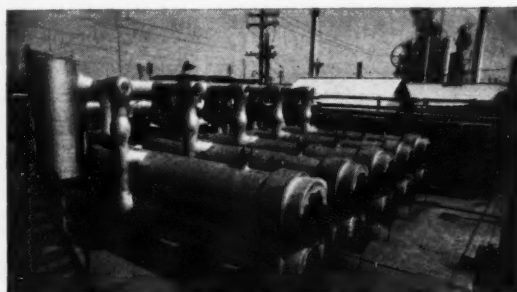
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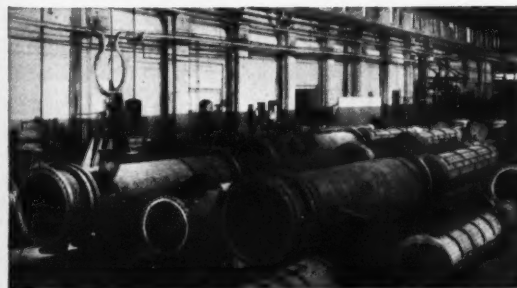
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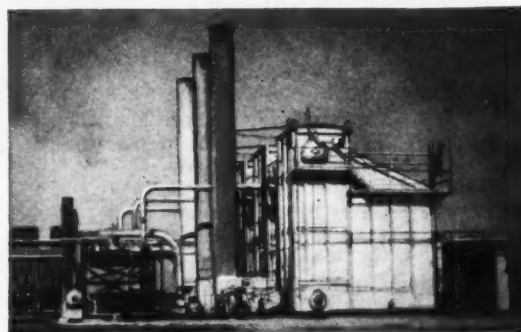
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Considering the vast proportions which our export trade has now reached, our dependence on numerous imports, and the great potentialities which lie ahead, I believe it is highly important that we continue the present setup under the policies which have been evolved over many years now and under which our foreign trade has prospered as never before. ■

Tariffs — Lloyd

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On the other hand, productivity studies on chemical products and on many other industries, such as glass, paper, watches, shoes, and metal fabrication, indicate that foreign productivity runs from 1/2 to approximately equal that of American producers. Thus, the overall labor cost for foreign producers is much lower than for American producers. This cost advantage is reflected not only in direct labor costs but also in plant construction costs, handling costs, research costs, and all other indirect costs.

Tariffs Offset Low Foreign Wages

It is primarily to offset this excessive cost advantage that tariffs are necessary to permit US producers to compete on a reasonably equal basis in our home market. Most foreign producers have a substantial competitive advantage through their low labor costs. They object to US tariffs to compensate for even part of their cost advantage because they are not interested in, nor in fact are they willing to compete at, the average low level of profits common in United States industry.

Tariffs, which merely compensate for this unnatural advantage through low labor costs, are paid by the foreign producers and come directly out of their profits. Astute

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JOSEPH AMANN became president of the Engineers and Scientists of America in 1952. He was trained as a physicist and is registered as a professional engineer in the state of Minnesota. He was employed by the Minneapolis-Honeywell Regulator Company from 1943 to 1954. While there he was engaged in a variety of engineering activities. He left the company in 1954 to devote his full time to ESA.

"Forming an organization to get something done is the story of our country's history. It's as American as apple pie" — says Joseph Amann.

"In order for engineers to solve the problems now facing them and achieve proper economic and professional recognition . . .

engineers must be unionized

JOSEPH AMANN, President
Engineers and Scientists of America

Collective bargaining in the engineering profession is needed more than ever today. Even though there's a shortage of engineers and starting salaries have gone up, dissatisfaction is growing in the field. Typical of this feeling of discontent is the phrase frequently overhead these days: "There are only two kinds of engineers today — those looking for a raise, and those looking for a better job!"

Why all this dissatisfaction? There are many reasons. The ones most frequently cited are: 1) inadequate pay, 2) lack of professional recognition, 3) telescoping of salaries between beginners and senior employees, 4) lack of security, 5) too much routine work, and 6) poor working conditions.

Increased Demand Caused Problems

What brought all this about? Let's look at the reasons behind the reasons.

Back in 1930, there were about 215,000 engineers and 46,000 scientists in the US. Today there are about 585,000 engineers and 140,000 scientists. There are fewer independent manufacturing

companies now than in the 1930's. The ones today are all bigger and the products they make require more engineering.

The demand for technical brainpower has skyrocketed. Engineering departments of many companies have become gigantic. As a result of this growth, engineers have found that their former quasi-management status has disappeared — along with any accompanying privileges and prerogatives.

They have also discovered that their salaries are becoming less and less commensurate with their position. They are no longer hired by the person for whom they are to work, but by a professional recruiter. Once on the job, they merely become a number in the personnel file rather than a name.

Personnel policies and salary rating systems which guide their supervisors are merely "doctored up" versions of those in effect for plant operators and maintenance men. Additional levels of supervisors and pseudosupervisors have interposed between engineers and the top management people, making it almost impossible for engineers to communicate their thoughts, likes, and

grievances to management.

Communication through multiple layers of supervision results in a garbled and warped story by the time it reaches top management. Management's answer is probably even worse when it reaches the engineer since the channels are the same and supervisors are more prone to interpret management orders, edicts, and stories than they are to interpret those of employees.

Engineers' salaries are no long-

abilities to the fullest.

All of these things together have made engineers realize that something must be done. The most natural thing is to do what groups interested in effective action have always done: form an organization. Forming an organization to get something done is the story of our country's history. It is as American as apple pie. It was in this fashion that independent engineering unions were established throughout the country.



" . . . Communication through multiple layers of supervision results in a garbled and warped story by the time it reaches top management . . . "

er keeping pace with the advancing economy. Experience and proficiency are becoming less and less important. Specialization means the engineer's job is becoming routine. This creates a pernicious mal-utilization which will stunt and frustrate the engineer's desire to develop his

How Successful Have Unions Been

There are now more than 65,000 (about 9% of the total) engineers and scientists in this country who are represented by a collective bargaining agent. These groups have successfully alleviated many of the effects of the conditions enumerated above.

What's All This About Unionism for Engineers?

An engineering crisis exists because of the shortage of engineers and the increased mechanized economy. Experts feel the shortage will get worse and last for many more years. With this growing crisis comes growing dissatisfaction among engineers. Salaries are telescoping. Young engineers are getting high starting salaries and want regular, good-sized increases. Older engineers complain that their experience is not being adequately compensated.

Engineers are crying for professional recognition. They complain that management treats them much the same as non-professional employees. They want their grievances to be heard.

They want more time and facilities for research and study to maintain their professional status.

Will belonging to a union solve these problems? Some say yes. Others feel that a union will deprive the engineer of his professional status and take away his incentive. Some say that compulsory registration and belonging to a professional society is the cure.

Today there are more than 65,000 engineers and scientists in the US who belong to unions. This article presents the "pro" side of unionism. The "con" side will be cited in a separate article scheduled to appear in the near future.

They have prevented poor morale from degenerating into malignant frustration by providing machinery with which relief can be obtained from grievances and abuses. They have promoted more efficient and equitable salary administration. They have reduced nepotism and "management-by-cronyism."

A collective bargaining organization is the *only* instrument which guarantees industrial democracy in the engineering department. It promotes more effective

work. They seek to improve the utilization of engineers so as to afford them a maximum opportunity to develop their competence and to realize the consequences thereof. In conjunction with this, engineering unions seek to improve educational opportunities for engineers and scientists as well as their opportunity to participate in technical meetings. The unions are also encouraging management to develop methods and techniques by which the technical ability of an engineer can be measured more reliably than is now the case.



"... Once on the job, engineers merely become a number in the personnel file rather than a name ..."

Merit Increases

Engineering unions are interested in the so-called merit increase programs which exist in virtually all engineering departments. Naturally, the unions advocate the rewarding of their members for outstanding and meritorious performance. All too often however, the merit raise program is used to cut the salaries of certain engineers in a painless fashion under the guise of an increase.

This happens when the "merit" increase given him actually amounts to less than the blanket raise to which he really was entitled anyway, because of the decreased value of the dollar and higher starting salaries. Such practice is not only dishonest, but immoral and unethical. Engineering unions can control it by negotiating changes in the salary structure at regular intervals. In this way each engineer knows what the base is and can check his progress against that base.

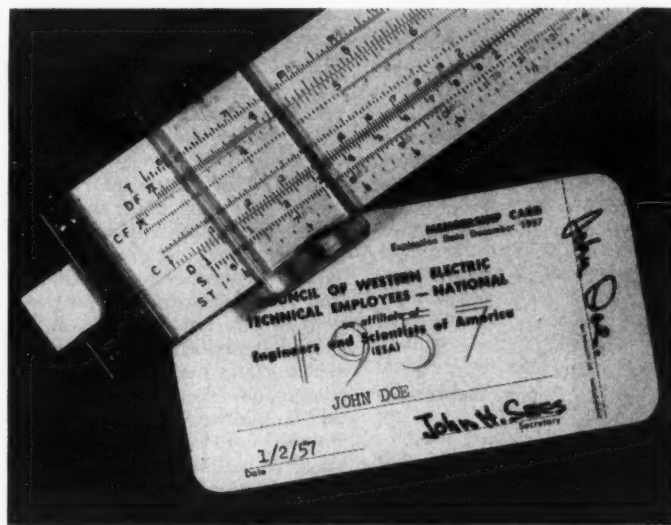
Engineers and scientists must do creative work. They seek to improve the utilization of engineers so as to afford them a maximum opportunity to develop their competence and to realize the consequences thereof. In conjunction with this, engineering unions seek to improve educational opportunities for engineers and scientists as well as their opportunity to participate in technical meetings. The unions are also encouraging management to develop methods and techniques by which the technical ability of an engineer can be measured more reliably than is now the case.

Engineers and scientists in unions are seeking to boost their salaries to a level where they will be commensurate with their contributions to society and to the enterprise which employs them. They want to raise the value of proficiency and experience to a level where there will be a future in an engineering career from a remunerative standpoint. This will also serve to provide sufficient incentive to an engineer to develop his technical competence to whatever extent his abilities will permit.

Unions are seeking to improve the environment wherein engineers and scientists must do creative work. They seek to improve the utilization of engineers so as to afford them a maximum opportunity to develop their competence and to realize the consequences thereof. In conjunction with this, engineering unions seek to improve educational opportunities for engineers and scientists as well as their opportunity to participate in technical meetings. The unions are also encouraging management to develop methods and techniques by which the technical ability of an engineer can be measured more reliably than is now the case.

Engineering unions seek to improve the status of the engineering profession since they recognize that engineers and scientists alone are responsible. They recognize that in this day of corporate bigness, industrial democracy becomes an absolute prerequisite to political democracy if our democratic system, which emphasizes the importance of the individual is to continue.

In order for engineers to solve the problems now facing them and achieve proper economic and professional recognition, engineers must be unionized!



What is the ESA?

The Engineers and Scientists of America is an independent engineering bargaining group designed to represent only engineers and scientists who are defined as professional by the Taft-Hartley Act. It does not represent any engineers and scientists who are management or supervisory as spelled out by the act.

ESA was organized in 1952 for the purpose of uniting a number of independent engineering bargaining groups existing in the US at that time. Its current membership is about 40,000 — approximately 8% of these are chemists and chemical engineers. The national headquarters is in Washington, D.C.

Comments on **CHEMICAL PROCESSING's** recent patent article (May 1957, page 10) indicated the need to probe deeper into the controversial subject of how best to make the patent system more effective. Here, based on remarks by the Commissioner of Patents and various, selected patent attorneys in industry, is . . .

an amplification of problems surrounding patents



MUCH has been said about the difficulty the Patent Office is having in fulfilling its objectives—to issue valid patents and to issue them promptly. To find out just what the problem is, and what steps are being taken to solve it, **CHEMICAL PROCESSING** went to The Commissioner of Patents, the HONORABLE ROBERT C. WATSON and various patent attorneys in industry.

When asked about the situation in his office, Commissioner



COMMISSIONER
WATSON

Watson said, "The period following World War II found the Patent Office faced with a staggering accumulation of over 230,000 applications which has been only moderately reduced to this day. It is estimated that the average length of time between filing an application and patent issuance approximates 3½ years, a condition which obviously precludes the fully effective operation of the Patent System.

"The problem of this tremendous backlog has received in-

creasing attention from the Executive and Legislative branches of the Government and from the public. In October 1954, Secretary of Commerce Sinclair Weeks appointed Dr. Vannevar Bush to head a committee of experts to review Patent Office operations for possible application of high-speed electronic devices. While the committee found no existing devices suitable, its recommendation, that a joint program of machine research and development be undertaken with the Bureau of Standards, has been implemented and has shown encouraging accomplishments to date.

"Increased funds have been recommended by the President and approved by Congress, enabling the Patent Office to initiate an eight-year program of backlog reduction. Although the competition for the services of engineers and scientists is abnormally strong, the Office has been able to enlarge its examining staff by about 300 to date and is exploiting every avenue of recruitment to bring its staff to the level required in its backlog reduction effort."

But what about the many proposals to alter or revise the patent statutes? Several have been made

and are presently under study by Senate Subcommittee on Patents, Trademarks and Copyrights.

One person who sums up quite a bit of thinking on this is DONALD L. DICKERSON, Patent Counsel, Socony Mobil Oil Company. Mr. Dickerson states, "My own conviction is that we



D. L. DICKERSON

have an excellent Patent System. I have always subscribed to the philosophy that nothing is so good that it cannot be improved upon, but I find that often the desire for 'change' rather than 'improvement' is the stimulus for many proposed modifications in things which are already approaching perfection. Contemplation of the Nation's past progress in areas of science and useful arts right up to the present, and speculation as to future progress in the light of some knowledge as to 'what is going on,' should make one extremely cautious about suggesting changes which might affect the underlying principles of our Patent System.

Within the framework of our present system it is possible to (a) reduce the incidence of granting invalid patents, (b) improve patent disclosures as contributions to technical literature and (c) shorten the interval between the 'filing date' and 'issue date.' But it is suggested that progress in these regards is largely a matter of continuing and re-emphasizing the past and present effort to maintain in the Patent Office a staff adequate in training and magnitude to effectively and efficiently accomplish an administration job which grows more difficult at each stage of technical progress.

"Our Patent Laws and the Patent Office Rules of Practice are the product of many years of legislative, administrative, and judicial effort. Each proposed change should be carefully examined to determine its effect upon the intended purpose of the Patent System. If, on the other hand, the proposal will strengthen the position of the Commissioner for obtaining, maintaining, and increasing the efficiency of the staff required for this important, highly specialized job, it would seem to deserve prompt action. In this regard it is suggested that proposals which will have the effect of improving

salary rates, office conditions, and working facilities in the Patent Office hold part of the answer to our question of how to improve the Patent System."

Of the proposals for amendment of the US Patent System now being aired, none is likely to produce more division of opinion among those concerned with administration of patents than the suggestion that there be provision for "defensive patenting."

H. R. MAYERS, General Patent Counsel, General Electric Co., is one who favors some provision for defensive patenting. His ex-



H. R. MAYERS

planation of the proposal is that — "There be added to present law a mechanism by which a party more concerned with preventing the later patenting of his minor inventions by others than with securing for himself a patent of arguable enforceability may, without undue formality and with minimum legal effort, register a provable claim of priority in the Patent Office.

"Since specific legislation to this end has not yet been introduced, the details of the registration process can only be suggested in broad terms. They would certainly include procedure by which an applicant, whose patent application had been found to comply with reasonable requirements as to form, could, by waiving all claims to the 17 years of protection offered by the usual patent and upon payment of a suitable fee, obtain issuance of his 'patent' as a priority record, thereafter to appear as such in the files of the Patent Office. Such issuance would occur promptly and without the usual time-consuming and costly argumentation between patent attorney and government examiner.

"It is assumed further that the enabling legislation would make this type of patent effective as a piece of priority evidence as of the date of filing (its underlying application) in the same sense that the 17-year patent consti-

tutes such evidence today. Beyond this, the so-called patent would confer no exclusive or other rights upon its possessor.

"Probable embellishments of the above would permit one who chose initially to file his application in the conventional form to defer election to waive his claims to the usual patent protection (i.e., in favor of a purely defensive patent) until after the Patent Office had made a preliminary examination for novelty. A further suggestion would permit the applicant to withdraw his election, even though once made, if a second applicant were to come into the picture claiming, as to similar subject matter, a priority of invention which the first applicant desired to contest.

An aid to industry

"Those who favor the proposal see in it at least a partial answer to the problem of the research institution or business which feels itself obliged to file patent applications on inventions even of marginal importance or novelty, lest they become the subject of 'nuisance patents' acquired by competitors on the basis of work done at a slightly later time. These argue that both their pending application files and corresponding files of the Patent Office contain a substantial number of long-contested and expensively handled cases of marginal significance which could have been disposed of at far less cost and tie-up of Patent Office facilities by the simplified procedure which the defensive patenting concept visualizes.

"Those who oppose the defensive patenting idea assert its inconsistency with traditional objectives of a patent system and question the realism of its alleged cost savings. Beyond this, however, it is most strenuously argued, especially by some in the chemical field, that the proposal would invite the filing of numerous applications whose chief objectives would be the airing of highly speculative concepts intended to 'muddy the waters' and undercut the patent potential of competitors. To this, it has been rejoined that nothing now prevents the publication through existing channels of purely spec-

ulative subject matter by those who think it worthwhile so to proceed."

Mr. Mayers poses a query as to whether any better way exists of resolving these countervailing arguments than by an appropriately guarded-legislative experiment which would permit the defensive patenting idea to be tested in practice. He suggests that as a safeguard against the experiment, the enabling legislation might include provision for periodic reports to Congress as to whether the predicted benefits or the foretold evils have in fact predominated in actual usage.

Along the same lines, a proposal is being made to hasten patenting and consequent announcement of new drugs. The Subcommittee on Utility Practice of the Chemical Practice Committee of the American Patent Law Association has been directed by the Commissioner of Patents to provide a memorandum on this subject.

Chairman of that Subcommittee, JOHN H. SCHNEIDER, Patent and Trademark Counsel, Abbott Laboratories, has stated that the



J. H. SCHNEIDER

memorandum will more than likely go to the Commissioner this month. His explanation of the move is, "One of the most vital problems in the pharmaceutical field with respect to patents centers around the attitude which the Patent Office currently takes toward patents covering the fruits of pharmaceutical research. The concept currently practiced is the one wherein patent protection is granted only where cures can be demonstrated in actual human therapy. The impact of such practice is to produce a lag in the progress made in this field by causing inventors to withhold publication of results until clinical studies have been completed.

"There is a great deal of activity at present on the part of the ADMA (American Drug Manufacturers Association), the

American Patent Law Association, and the Association of Research Directors to establish a better understanding of the significance of physiological activity in test animals as the basis for establishing utility of new compounds and new compositions.

"It is imperative that inventors in this field and their financial sponsors have cause to feel secure in the early publication of the fruits of their research efforts. This security can be seriously jeopardized if the criteria for showing the utility of the invention are set at a level substantially beyond the point at which the skilled pharmacologist can establish outstanding physiological activity in test animals, coupled with low toxicity. Significantly, it is at this point that the publication of results will serve as the earliest effective stimulus to others.

"The effectiveness and tolerance of new drugs is a phase of pharmaceutical development that is governed by the necessity for extensive and even exhaustive clinical and pharmacological testing before approval for sale is indicated by the Federal Food and Drug Administration. This approval functions to safeguard the public against the sale of unproven drugs.

There are a few instances in other fields where such safeguards for the public are practiced. However, in no other industry are there more effective measures for insuring the practice of safeguards. In most industries, market acceptance is the only test. The significant point, however, is that no one expects a patent to be refused merely because a consumer research or an underwriter's seal of approval has not been obtained. The patent on the product of pharmaceutical research is no different in this respect, provided that the applicant does not assert in his application for Letters Patent that the compound or composition is ready for human use at the stepping-stone stage."

Because of the problems surrounding the Patent System, many think that secrecy may be a substitute for patent protection.

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Patents

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When asked about this, WILLIAM M. YATES, Director, Patent Department, the Dow Chemical Company, states, "If the inventor decides to give



W. M. YATES

up patenting and rely on secrecy, the help he gets from the law is woefully little. The law does, of course, require the utmost fairness of all who deal with the inventor and know, or should know, that he is trying to keep a secret. The police will help him in guarding his plant, and the courts will insist on good faith on the part of all suppliers and employees whom he has sworn to confidence. But, quite in contrast to the rights it gives a patentee, the law gives a secret practitioner no protection against the likelihood that someone will in all honesty buy his product and, by careful and determined inspection and analysis, puzzle out the secret and start up in the same business. Worse, if the practice remains secret, the law will actually encourage and may even grant a patent to someone else who independently makes the same invention.

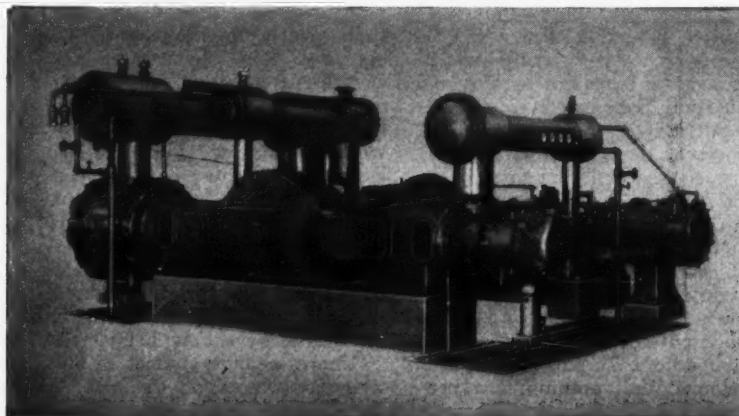
"Reliance on secrecy as a protective policy for an invention also keeps one away from the industry-wide meetings and conventions where ideas flow back and forth. Even if he avoids being branded as aloof or uncooperative, it is only with rare exceptions that the secretive producer escapes being gradually left behind by his competitors.

"While secrecy as a substitute for patenting has serious long-term disadvantages, limited secrecy can be an important part of a vigorous patent policy. Secrecy while the patent application is being prepared is almost universal. Indeed, it is fatal to patenting a US invention in most foreign countries, if publicity is given before the US application is

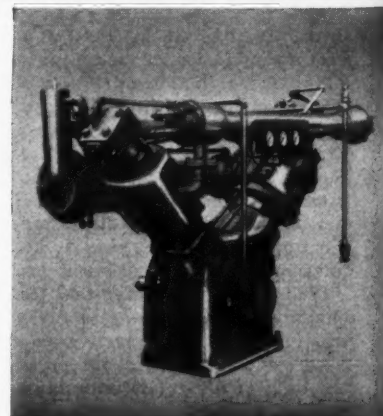
Compressors with 'round the clock dependability



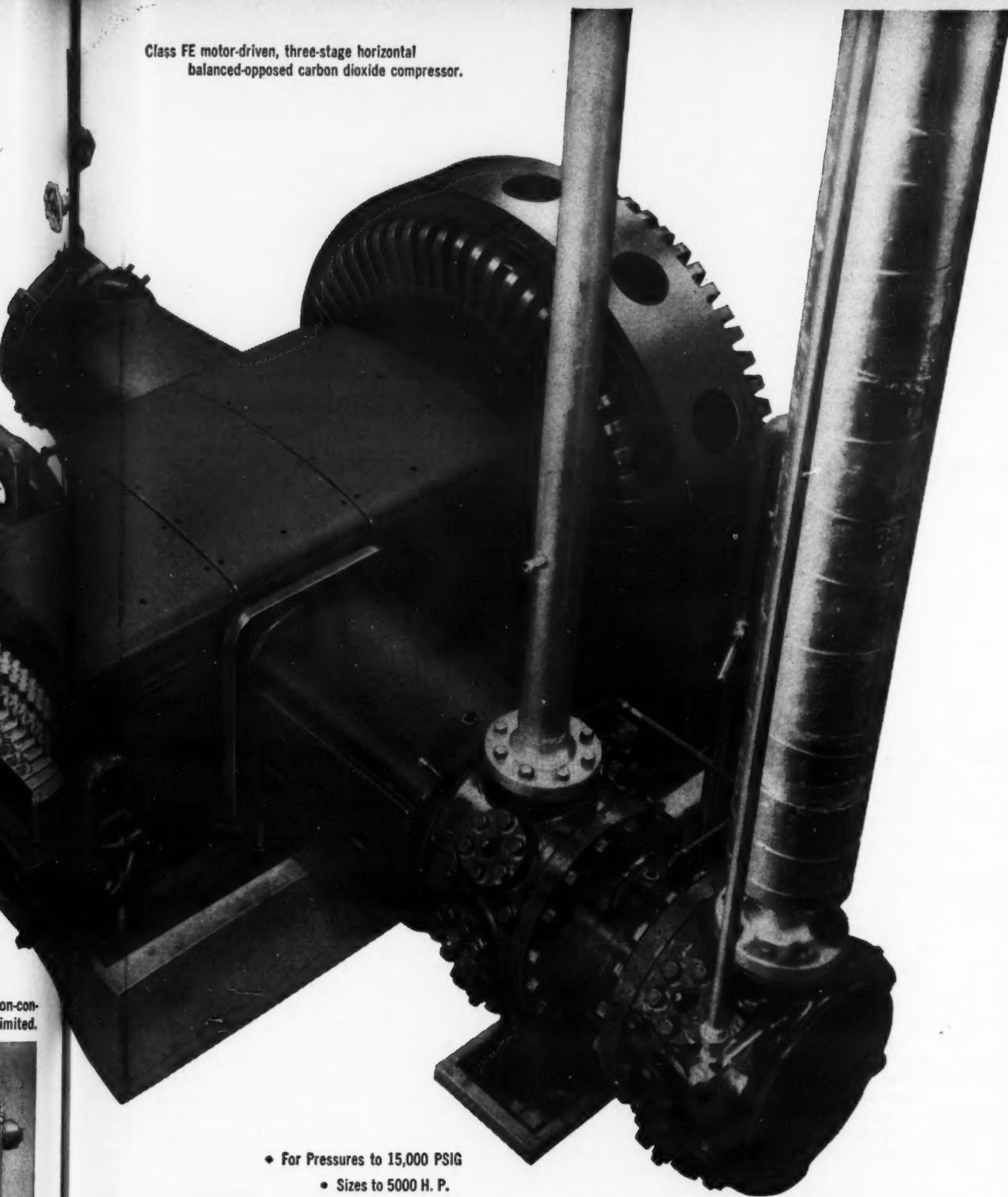
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AUGUST 1957

on file. Many corporations also feel that processes and process equipment should be kept secret right up until the day the patent issues, in order to prolong whatever headstart there may be.

"Secrecy, in the form of an obligation to keep in confidence process knowhow which is unpublished, can also be a valuable part of a patent licensing program. The corporation which develops a new and important chemical process usually acquires, in addition to patents on the basic process steps, a body of unpatented knowhow covering detailed information on apparatus design, materials of construction, sources of supply, and the like, all important to the economy of the process. If it is decided to license others to operate the process, such knowhow is commonly made available in addition to rights under the patents, provided the licensee agrees to keep the knowhow confidential for some stated period. Knowhow commitments of this type may have high commercial value in the beginning years."

One of the ideas which has grown up about the patent system is that companies suppress patents that might otherwise hurt their business.

When asked about the existence of patent suppression, PIKE H. SULLIVAN, Manager, Development and Patent De-



P. H. SULLIVAN

partment, Standard Oil Company of Indiana, said, "Myths are persistent and die hard. And the myth of patent suppression seems to be one of the most durable of them all. It seems to thrive on rumor—probably because of the cloak-and-dagger atmosphere of such stories make them very fascinating.

"Most of us have heard such tales at one time or another.

Turn to page 218

drugs and biochemicals — tomorrow

ALLAN J. GREENE

Administrative Vice President
Chas. Pfizer & Co., Inc.

AT work today is a triumvirate of forces that should keep pharmaceuticals at the forefront of chemical industry progress through the next decade. Continued emphasis on research . . . expanding population . . . and rising standards of living both here and abroad justify an optimistic view of the pharmaceutical industry's future over the next ten years.

Admittedly, product obsolescence in the pharmaceutical industry is rapid. But it is just this obsolescence, stemming from keen research competition, that sets in motion the new product cycle, continually pushing the industry forward.

By 1965, if present trends continue, the pharmaceutical industry's sales may approach \$4 billion, compared with the estimated 1956 total of \$2.1 billion. What will be responsible for this impetus?

Three of the most significant advances in pharmaceuticals in recent years, it is generally conceded, were the antibiotics, the steroid drugs, and the ataraxics or tranquilizers. Among these three major areas of drug re-

search today, the search for antibiotics has been narrowing, for now it is pinpointed against specific problems of infection. In contrast, the fields of steroid and tranquilizer research are opening ever wider, sending research teams in novel and often previously unsuspected directions.

Until two years ago, for example, research scientists spoke of "steroid hormones." Today that must take into account the discovery of an anesthetic which — although a steroid — has no endocrine effects.

This discovery, named Viadril, has led to the quite natural suspicion that there may be many more such non-hormonal steroids waiting to be discovered.

Viadril already has provided valuable leads to new types of drugs. The fact that it is water-soluble provided a clue to a new series of steroids which are referred to as dermacoids. They are particularly valuable against skin diseases because their water-solubility provides superior penetration into the tissues, while their lipophobic properties prevent their dissipation into deeper layers. They are so versa-

tile that it is possible to tailor their molecules for the specific topical use the clinician has in mind.

The dermacoids have excited a good deal of medical interest, for improved corticosteroid drugs for the treatment of asthma, arthritis and rheumatoid diseases (as well as skin and related diseases) are a primary target of current research. Few pharmaceutical houses are equipped to do large-scale research in this difficult field. Now a search is being prosecuted actively for what has been described as a "third round" in corticosteroid drugs.

The first round, of course, included cortisone and hydrocortisone, together with ACTH; the second advance produced prednisone and prednisolone. The latter drug is still the leader in its field, but pharmaceutical research workers would like to uncover a new one with even greater efficiency.

Interest in tranquilizers is now broadening into a general inquiry into the chemistry of the mind. The development of these drugs has provided, for the first time in medical history, the be-

ginnings of a pharmacology of mental illness. Many investigations of the still-mysterious mode of action of the tranquilizers are now under way. It no longer seems too optimistic to believe that medical science may some day be able to treat mental illnesses of all kinds with the same degree of specificity — and the same degree of success — as infectious diseases are now attacked with antibiotics.

Significant, if less startling, developments are taking place in the field of antibiotics. We have discovered important new weapons against the staphylococci, a group of disease-causing bacteria which sometimes exhibit amazing adaptive resistance. New antibiotics and synergistic combinations, aimed directly at these specific organisms, have just appeared on the market. Today there is a trend toward the rational use of combined antibiotics, employing, for example, the mutual reinforcement of tetracycline and oleandomycin to achieve a multiple anti-bacterial range, even including organisms which have become resistant to older antibiotics.



ALLAN J. GREENE has been associated with Chas. Pfizer & Co., Inc. since graduation from Yale University in 1938. He joined Pfizer as a chemical engineer in the research and development division.

In 1941, he became production supervisor at Pfizer's Brooklyn plant being placed in charge of the citric acid fermentation department in 1943.

Eight months after promotion to assistant superintendent in 1949, he was appointed general production manager for the company.

Since 1954, he has been director of commercial development, elected to Board of Directors, and, in December 1956, appointed administrative vice president of the company.

Preventive medicine

Preventive medicine is an area that may bring about profound changes in the entire pharmaceutical industry. The Salk polio vaccine has already stimulated interest in other phases of antiviral research, and vaccines for the common cold, respiratory infections, and measles may be just around the corner.

Many physicians now believe that the key to successful preventive medicine is the concept of "maximum health." According to this theory, the body is in a state of equilibrium, and disease is a distortion of this equilibrium in any one of many ways, some of which have previously not been manifest. The treatment of disease will involve more than elimination of the causative organism. The patient's whole body will be treated and many weapons brought to bear in order to return his body to the equilibrium state as soon as possible. This will focus more attention on hormones, vitamins, enzymes, the endocrine system, the reticulo-endothelial system, and the entire complex chemistry of the body, its organs, glands, and

cells. This could result in an uncovering of many of the secrets of life itself.

New concepts in nutrition already seem destined to play an important role in the drug industry in forthcoming years. Fortification of foods with vitamins and minerals has been an accepted practice for many years. Now, however, nutritionists are investigating the value of adding to the diet one or several of the essential amino acids — those "building blocks" of proteins which cannot be synthesized in sufficient amounts by the body. Since there are eight such amino acids, the results are not all in by any means; but there already exists a clear body of evidence for the fortification of baked goods with L-lysine.

If this becomes an accepted practice, production on a very large scale is going to be required. Vitamins and minerals are at best micro-nutrients, which need to be added to foods only in small amounts. Amino acids, on the other hand, are nutrients in the fullest sense of the word; if they are to be added at all, they should be added in relatively large quantities.

In addition to helping upgrade the diet, products of the drug industry may also be among the means of expanding the world's usable food supply. Recent research has shown that antibiotics, in conjunction with modern refrigeration, can preserve food at its peak of freshness for extended periods of time. It has been found, for example, that as little as a thirty second dip in a solution of oxytetracycline, a broad-range antibiotic, will more than triple the shelf life of vegetables and add to the effectiveness of present refrigeration techniques. Conversely, it has been discovered that injecting livestock, just prior to slaughter, with oxytetracycline permits the high temperature (60°-100°F) aging of meat — without spoilage — to obtain better color, tenderness, and flavor.

Oxytetracycline used in these tests is a component of Biostat-PA, which has already been accepted by the Food and Drug Administration and the US Department of Agriculture for use by processors to retard the bacterial spoilage of poultry. More recently, the Canadian government has accepted the use of

this product to halt the growth of bacteria responsible for the deterioration of fish.

In another area of possible expansion of food supply, the microbiological cultivation of foods seems almost certain to be a practical reality as a result of the demands of our increasing population. These new tools may come from algae, higher plant tissue, animal tissue, or iron or sulfate reducing bacteria. All these techniques are being investigated, and it seems logical to assume that one or all will be successfully developed.

In expanding usable supplies of petroleum, microorganisms may also help us to squeeze the last drop out of our dwindling oil reserves. Experiments are now underway using these in tertiary oil recovery after all secondary methods have played out.

These estimates of tomorrow's products are, of course, merely extrapolations of today's developments and demands. But they can give us some guidance in finding what lies beyond our farthest boundaries — imagination coupled with practical scientific investigation. ■

Increased demands for various types of modified starch products with new high-quality standards prompted A. E. Staley to design and build a new starch dryer plant. Employing many innovations in starch processing and handling . . .

this plant produces starches old plant couldn't

GEORGE MICHAEL,
Assistant Editor

ROBERT SCHWANDT,
Assistant Superintendent
Dry Starch Section

A. E. Staley Mfg. Co., Decatur, Ill.

Problem: Higher degree of purity, more uniform moisture content, and closer control in production of specialty starches were requirements which could not be met with existing facilities at A. E. Staley Mfg. Co., Decatur, Ill. These special, more expensive starch products, were increasingly in demand by textile and paper industries.

These products required special handling and processing procedures, for their specifications called for better color and lower ash content than some others made by Staley.

Existing facilities, the same as has prevailed in corn proc-

essing industry for many years, could not meet new standards set up by Staley. At best, Staley could make small process changes in an attempt to improve production methods, but setup was just not right. For example, the drying process—dumping wet starch cake into wire baskets mounted on cars and pulling cars through kilns—would not produce material to meet desired specifications.

Also, trend to bulk handling in customer plants was in full swing. Customers were ordering these products in bulk cars, and Staley wanted greater capacity and flexibility for making bulk shipments.

Solution: In spring 1955, Staley's engineers and technicians started planning a new facility for processing these oxidized and other modified starches. This facility would make use of automatic, continuous equipment for wash-

ing, drying, blending, packaging, and shipping these products.

Plans called for a new ten story building of modern design. Excavation was begun in late summer of 1955, and the facility was finished in late summer 1956. It went on stream in November 1956.

The installation makes full use of automatic and other labor-saving equipment. Processing systems are operated from centrally located control panels.

Starch from the conversion plant is pumped into stainless-steel receiving tanks. From there it goes through nylon-cloth shakers to vacuum filters. Cake removed from filters falls on a perforated screen which carries it through apron dryers.

Starch from dryers goes into ribbon blenders where provisions have been made for mixing blended products with a minimum of handling.

From the blenders, the starch is distributed by self-

Turn to next page



A. E. Staley's ten-story starch dryer building employs many innovations in starch processing equipment. Blue translucent plastic paneling runs completely around building on all floors

◀ All operations are controlled from centrally located panels. Use of automatic, continuous processes gives good product control, minimum handling, and flexibility





This plant produces starches old plant couldn't

Starts on page 46

cleaning conveyor elevators to any one of eight concrete-sprayed steel storage bins lined with maple flooring.

Versatile construction of packing and loading facilities permit disposition of starch from the bins in a number of ways. If it is to be sold in powdered form, it is pumped through pneumatic conveying system to the grinding building. If it is to be bagged, it is fed into two dual automatic filling and weighing packers that handle up to 600 bags per hour. From here, it can pass through a bag flattener and be conveyed to a palletizing station, or it may be delivered by conveyor to train shed for loading directly into cars.

For bulk shipment, the starch may enter the train shed by either one of two systems. Facilities are such that they can load both box and hopper cars.

The building itself, for beauty, proper illumination and safety, has horizontal bands of translucent blue glass-fiber-reinforced plastic running completely around it on all floors. The 25,000 sq ft of plastic paneling is set in aluminum frames and is so designed to release pressure in the building in case of explosion.

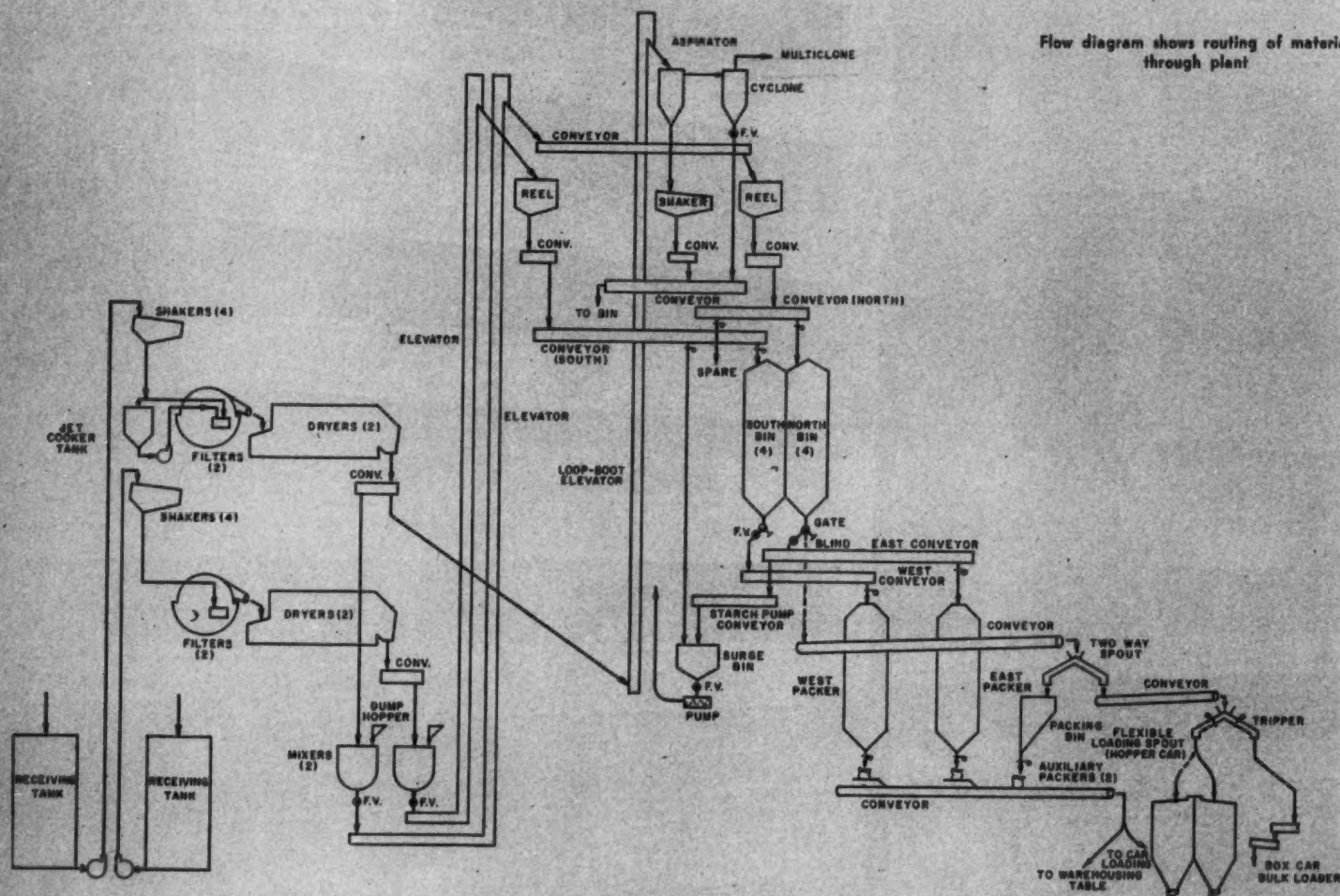
In the dry starch end of the building, humidity is carefully controlled at 50%. Troughs under the windows collect and direct moisture to outside drains.

Results: New facility has been responsible for continuing to make these special starch products two of Staley's largest tonnage items. Besides, the new approach in starch processing equipment has proved itself by turning out products higher in quality than was anticipated.

Washing and drying opera-

Here are some of the starches from Staley's new plant

PRODUCT	USES
STAYCO Oxidized Starches	Extensive application in paper industry — at wet end; in tub, press, and calender sizing; in coating. Textile finishing. High-viscosity adhesives. In latex paints. Ceramic processing. As crayon binders.
ECLIPSE Thin-Boiling Starches	Textile warp sizing and finishing; paper sizing; laminating and combining. Bag pasting.
STACOLLOID Gums	Non-congealing starch derivatives for textile warp sizing and finishing. Paper surface sizing.
GRANSIZE Textile Homogenizer Starch	Textile warp sizing and finishing.
STA-THIK Starch	This starch is thicker-boiling than native corn starch. Adhesives; briquetting; paper wet-end additive. For textile finishing, backfilling, padding and for binding fillers.



Flow diagram shows routing of material through plant

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tions result in a uniform product with better dispersion properties when it is slurried in water. Color has been improved, and ash content lowered.

All equipment has resulted in a plant where housekeeping is not a problem, where former hard manual operations have been replaced, and where operating costs are low.

Next month's **CHEMICAL PROCESSING** will go into more detail on the packaging and shipping operations. This story will appear in Packaging & Shipping section.

(Oxidized and other modified starches are made by A. E. Staley Mfg. Co., Dept. CP, Decatur, Ill. . . . or for more information check 4999 on form opposite last page.)

Inorganic Chemicals

Starts on page 29

and silicon. Both were discovered long ago, yet both are finding many new uses. Germanium is used in transistors. Silicon is the secret of the "solar battery," now experimentally powering some telephone circuits, and may be used in supplying power for the man-made satellite. A number of plastic materials are based on this element.

Platinum, long used largely for jewelry, is used as a catalyst in chemical processes and in reforming petroleum products. It is also used in making rayon and glass-fiber-fabricating equipment. Today, 85% of the metal produced goes into industrial uses.

Rare earth elements and their compounds are finding increased use. They are of interest in special high-temperature alloys, glasses, phosphors, catalysts, and carbon arcs.

The future for inorganic chemicals looks bright. It is limited only by the skill and imagination of our chemical engineers and chemists. ■



Carrier Conveyors go for Cheerios and Trix!

490' SYSTEM GRADES, SCALPS, CONVEYS!

In 1955 when General Mills decided to produce Cheerios and Trix in their Toledo plant, the choice of conveying and processing equipment was all-important.

Because of the cereals' fragile nature, a screw-conveyor system was ruled out. An endless-belt system was also ruled out because of maintenance and cleaning requirements—and also because a special scalping process would have to be devised.

Eight Carrier Natural-Frequency Conveyors were finally chosen—a four conveyor system, each, for Cheerios and Trix. Each system grades and scalps the cereals, as it conveys them. All told, the Toledo plant has 490' of covered Carrier Conveyors, handling all of their daily cereal production, with an absolute minimum of maintenance!

Commenting on the Carrier equipment, Plant Engineer Robert Braeden said:

"These conveyors do all that we expected of them and require very little maintenance . . . I don't know of any other unit on the market today that could do a better job."

Write today for literature describing the complete line of Carrier Natural-Frequency Vibrating Equipment. Address: Carrier Conveyor Corporation, 202-A North Jackson Street, Louisville 2, Kentucky.

CARRIER NATURAL-FREQUENCY CONVEYORS

When inquiring check 5000 opposite last page

Tariffs — Lloyd

Starts on page 30

foreign businessmen price their products in the American market just enough under US prices to assure sales. Accordingly, changes in tariff rates merely change the profits available to the foreign producer or the importer. This is why foreign representatives are so active in lobbying in the United States against tariffs.

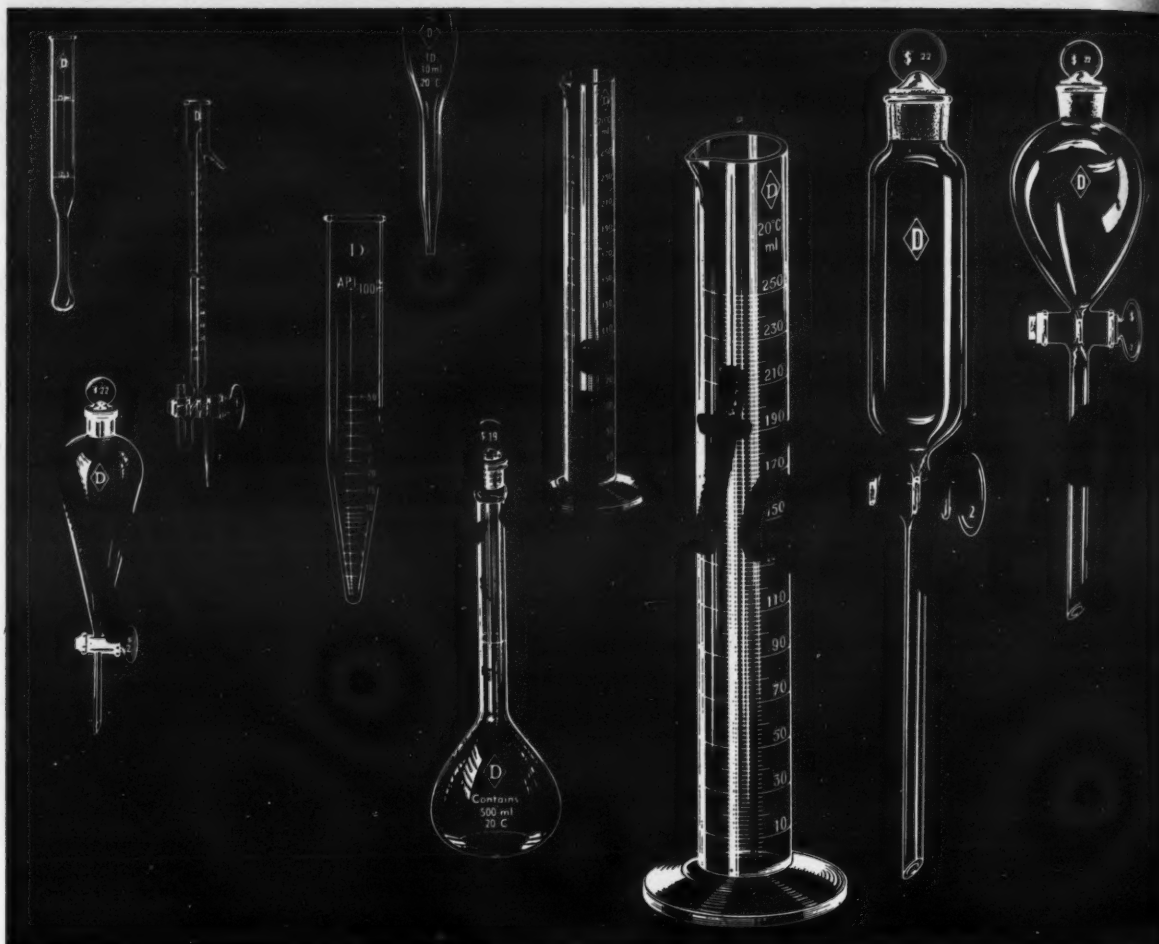
No small increase in process improvement or increased research can offset the cost advantage which modern foreign plants offer. There are several ways in which the American producer could meet this kind of low-cost competition. One would be to have sufficient tariffs to offset that part of the foreign producer's cost advantage which is due to his "sweat shop" wages.

Another method is for the American producer to move his plants to foreign lands where he, too, can hire cheap labor, and with American Capital and American know-how produce for export to the United States. With modern transportation, this is easy. This is already being done by a number of American manufacturers.

The "modern" trend is for American manufacturers to ship American machinery to Japan or Africa and to establish plants where labor costs are very low. In Africa there is an abundance of many raw materials, and labor is available at 40c per day. Companies with such plants easily meet competition from foreign companies in the US market. They make a good return on their investment, but they don't create many jobs here.

Thus, when we examine the fundamental factors relating to world trade, it is evident that we should expect US imports to increase. Import data indicate that they have been increasing since the war. The only reason why they have not been increasing more rapidly is that foreign plants

Turn to page 217



HOW MUCH HEAT-RESISTANT GLASSWARE DO YOU REALLY NEED?

Look around your lab. How much heat-resistant glassware is being used in operations where there is only a remote possibility that it will ever come in direct contact with flame? Heat-resistant glassware has been so extensively promoted in recent years that many users have been lured into purchasing it for applications where less-expensive lime glass would suffice. Don't be fooled!

Don't be misled by the confusing statements on heat-resistant glassware. *You can use lime glass for all laboratory applications except where direct contact with flame is involved.*

As further proof of the adequacy of lime glass, every piece of Doerr laboratory glassware, both in the top-quality Diamond D Blue Line and the Doerr White Line, can be washed in boiling water and immediately immersed

in water of room temperature. What additional thermal properties are required of laboratory glassware? Why pay for properties you don't need?

Need more proof? Consider the fact that Doerr also merchandises a line of heat-resistant glassware... but only for applications where it *must* be used.

MAKE THE DOERR 2-WAY TEST

To be sure you are getting the best possible value for your glassware dollar, make this simple test:

- (1) Obtain samples of the glassware you plan to buy. Test them in accordance with your actual needs.
- (2) Compare the prices and buy the glassware which offers you the best buy.

NEW "FACTS" BOOK AVAILABLE

Be sure to send today for our new brochure which gives the "facts" on the use of laboratory glassware.

DOERR GLASS COMPANY
Vineland, N. J.



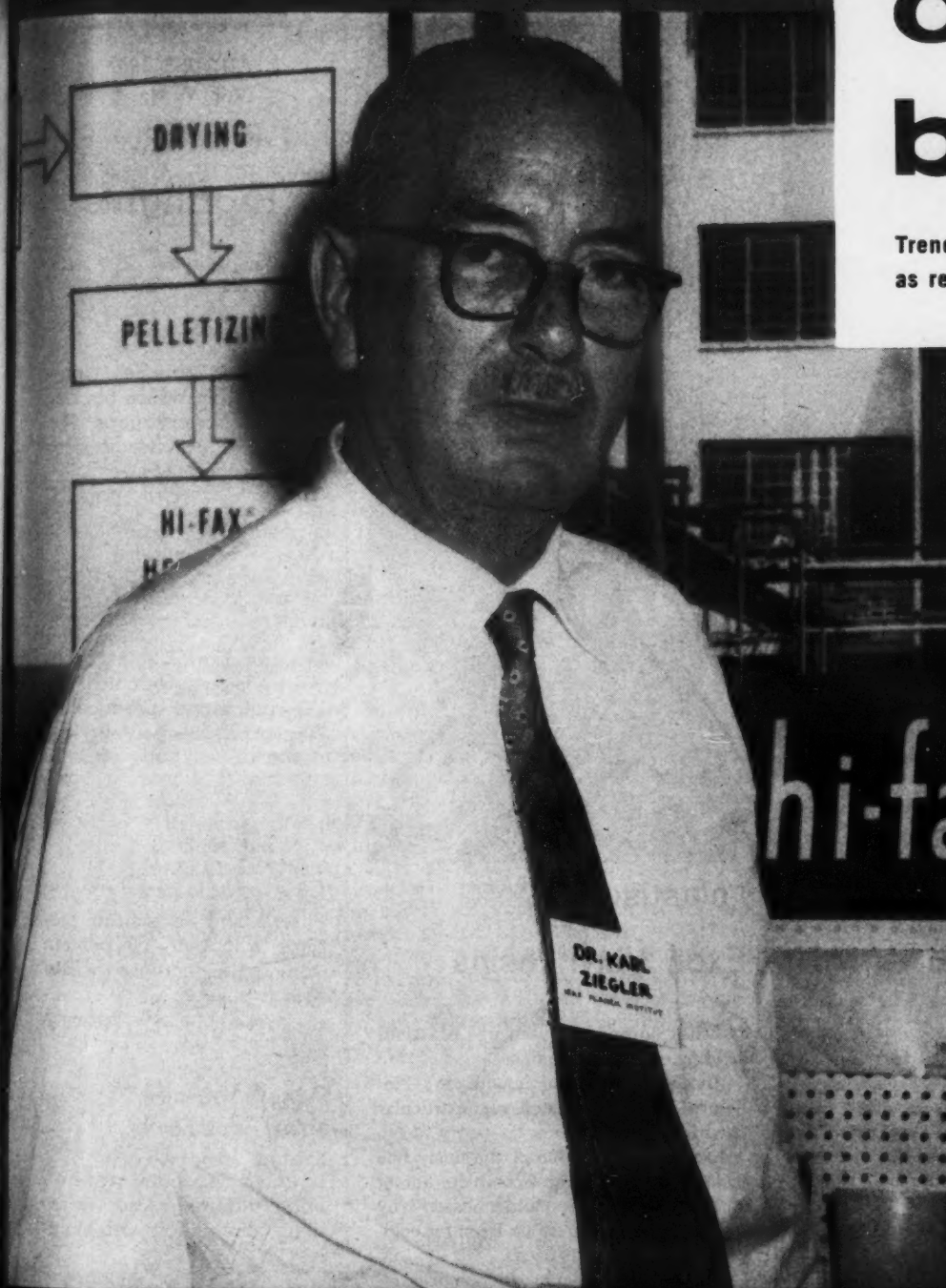
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CHEMICAL PROCESSING

chemical business

Trends in the chemical world . . . what they mean to you
as reported by the editors of **CHEMICAL PROCESSING**

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**Patent Office Declines
Comment On New Patent
Control Bill**

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**Sponge Price Reduction
Makes Titanium Greater
Threat To Stainless**

56

Professor Karl Ziegler

" . . . The Ziegler process represents not just a new polyethylene
but the first step in a new field of polyolefin chemistry" 53

THIS RESIN MAKES PLASTISOL MOLDING TOYS CHILD'S PLAY



Exon 654...specifically for **trouble-free** plastisols
...typical of the Pin-Pointed Properties in Exon Vinyl resins



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Exon 654 is just one of the many fine resins in industry's most complete line of versatile vinyls. It is another reason why industry looks to Firestone Exon for engineered answers to its needs.

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chemical
business

AUGUST 1957
Vol. V. No. 8

Highlights

Senator O'Mahoney introduces bill to reduce backlog of patent applications; Patent Office declines to comment on the measure

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Inventor Karl Ziegler opens valve, makes Hercules first US commercial producer of Ziegler process polyethylene

page 53

Pfizer's Carl Setterstrom predicts whopping 50 percent drug sale increase within next five years

page 55

Lowered sponge prices bring titanium closer to serious competition with stainless

page 56

Scientific Design Co., plans commercial scale production of catalysts for SD-designed processes

page 58

Revlon Buys Large Block Of Schering Corporation Stock

While not mentioning a merger as such, Revlon has confirmed reports that it has bought "a substantial interest" in Schering Corporation. **Charles Revson**, president of Revlon, reported that the company had acquired 150,000 shares of the pharmaceutical maker stock "for purposes of investment."

Revson said that the company had been planning to enter the ethical drug field for some time but surveys indicated that it would be unwise for Revlon to pioneer such an operation.

"It was, therefore, deemed advisable to make a substantial investment in an ethical drug company embodying extensive research, stability, and growth possibilities."

Schering president **Francis C. Brown** stated in a letter to employees that a large corporation was rumored to have bought a large block of Schering stock. He noted, however, that Schering management had "had no discussions of merger with these interests."

Florida Plant To Produce Terpene Alcohol Esters

Pensacola, Florida, will be the site of Heyden Newport Chemical's new plant to produce terpene alcohol esters. The plant is scheduled for completion sometime toward the end of 1957 and is part of the company's expansion program for up-grading turpentine-based products. Main items will be terpinyl acetate and iso-bornyl acetate, but plans also call for production of menthyl acetate and neo-menthyl acetate.

New Bill In Congress Aimed At Speeding Patent Issuance

Describing it as one solution to the Patent Office's backlog problem, **Senator Joseph C. O'Mahoney** has introduced in Congress bill S. 2277. This so-called Publication Bill will permit the publication by the Patent Office, at the discretion of the inventor, of patent applications without the grant of the usual monopoly — a procedure for "defensive patenting." So far the Patent Office has not taken a stand on the measure.

According to Senator O'Mahoney, the bill is designed to accomplish three major objectives — "First, to aid the Patent Office in its current program of reducing the backlog of 217,000 pending applications.

Second, to provide a procedure, usable at the discretion of the inventor, which will diminish the necessity for the accumulation of vast numbers of unused patents; and further, to lay the foundation for a monetary saving to the taxpayers by reducing the cost of processing Government-owned inventions."

In commenting upon the bill, O'Mahoney said that the study of his Subcommittee of Patents, Trademarks and Copyrights revealed that defensive patenting is practiced on a wide scale and that defensive patenting is one of the explanations as to why a study published by the Subcommittee showed that 38 companies each hold more than 1000 patents and 12 hold between 2000 and 10,759.

The defensive patenting proposal is one of the subjects covered in this month's Chemical Processing. See "An Amplification of Problems Surrounding Patents," starting on page 40.

Hercules' Ziegler Polyethylene Plant Goes On Stream

With the usual ceremonious valve opening, Hercules Powder became the first US producer of Ziegler process high-density polyethylene. Operator of the valve for the occasion was Professor Karl Ziegler of the Max Planck Institute, Muelheim/Ruhr, Germany, and inventor of the process.

The only previous producer of the material by Ziegler's process was Farbwerke Hoechst German chemical maker (page 30, June CP).

With the opening of its Parlin, N. J., unit, Hercules became the fifth American company to enter the high-density polyethylene race at the production level. Phillips, Celanese, and Grace are all shipping substantial amounts of material produced by the Phillips catalytic process,

has an annual capacity of 30 million pounds of the material, trademarked Hi-fax. This brings the total US on-stream capacity of high-density material to something on the order of 185 million annual pounds.

Additional capacity, soon to be on stream, should amount to 85 million annual pounds — 30 from Koppers and 55 from Union Carbide. And a rollof of companies with licenses or rumored to have licenses includes most of the big names in the chemical industry — Dow, Goodrich-Gulf, Eastman, Spencer, US Rubber.

The history of polyethylene is almost unique among US chemical ventures. Twice it has come to the fore; both times with processes available for licensing, and both times with a rather large number of companies clamoring to get into the business.

The first Polyethylene Rush grew out of World War II. A development of the British chemical maker, Imperial Chemical Industries, the material was licensed to DuPont and Carbide under terms of the Allied Powers patent pool. After the war — and after considerable legal hassling — the process was made available to all comers.

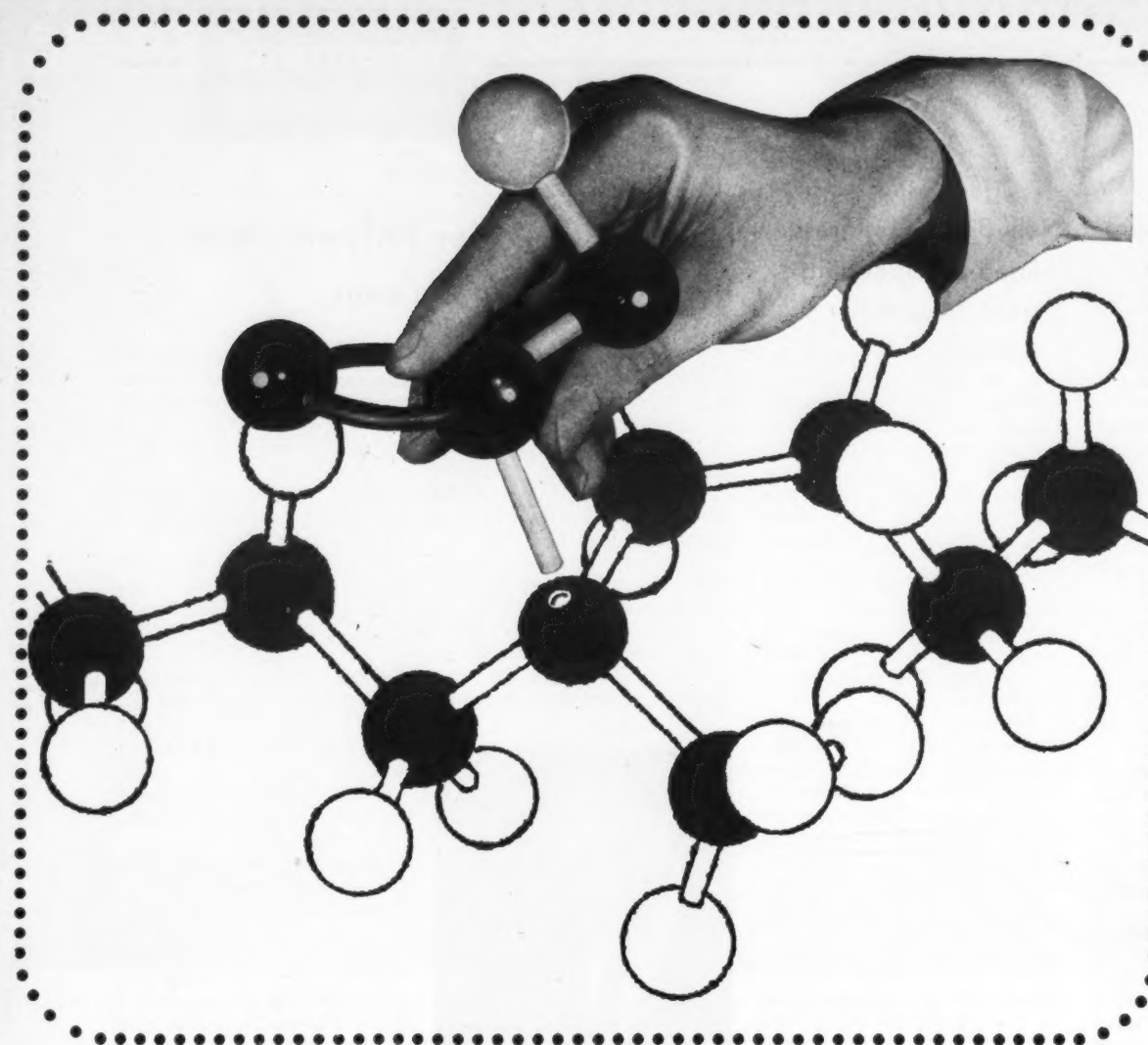
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Elmer Hinner, general manager of Hercules' cellulose products department, examines samples of high-density material

and Allied recently announced its own high-density material, produced by a process of its own development but presumably similar to the Phillips and Ziegler methods. A number of other US chemical makers have obtained licenses from either Ziegler, Phillips, or Standard of Indiana, but some have yet to announce definite plans for production.

The Hercules operation



For improved copolymers... add carboxyl groups by copolymerization with methacrylic acid

Rohm & Haas methacrylic acid offers a convenient and economical means of introducing carboxyl groups by copolymerization with monomers such as styrene, acrylonitrile, butadiene, acrylates and methacrylates. The addition of carboxyl groups, often in small proportions, may provide one or more of such advantages as:

- Improved adhesion
- Emulsion stability—both mechanical and freeze-thaw resistance
- Solubility in alkalies, including ammonia
- Reactive, cross-linkable groups which permit vulcanization with such agents as zinc oxide, diamines or epoxides.

Glacial methacrylic acid is readily available from full-scale commercial production. It is one of 18 acrylic monomers now available from Rohm & Haas. For full information on acrylic monomers write to Department SP.



Chemicals for Industry
**ROHM & HAAS
COMPANY**

WASHINGTON SQUARE, PHILADELPHIA 5, PA.

Representatives in principal foreign countries

When inquiring check 5003 opposite last page

Ziegler

Starts on preceding page

Within six months after the licenses became available to US firms, over two dozen companies had contacted ICI. By spring of 1953, five new US polyethylene makers had bought ICI's process — Dow, National Distillers, Spencer, Eastman, and Monsanto. (DuPont and Carbide, US wartime producers, also remained in the business.)

The Second Great Rush was much simpler in some respects, much more complicated in others. Although the buyers of the ICI high-pressure process had the benefit of years of production experience and know-how, the buyers of Professor Ziegler's process got little more than his "book" — little pilot data and no plant-scale engineering data. (And all this at a substantial price. Ziegler's contracts varied with the buyer and no price tag has been disclosed, but good guesses put the cost of his "book" at something like a million dollars, with a royalty of three percent on all material sold.)

The Phillips licensees have things a little easier. All Phillips process users — Phillips, Grace, Celanese, Carbide, and until they threw in the towel, Kellogg — have the advantage of a reciprocal know-how exchange. This has probably had a great deal to do with the fact that they have got on stream with less delay than the other processes. And Hercules, the first successful US Ziegler producer, had the benefit of the same kind of a deal with Hoechst.



"I'd like just a few minutes to acquaint you with our line."

CHEMICAL PROCESSING

"Next Five Years to See 50% Increase In Drug Sales" — Pfizer's Setterstrom

Predicting "another series of new product eruptions similar to those from 1947 to 1957," Chas. Pfizer's **Carl Setterstrom** told the Chemical Market Research Association that pharmaceutical sales would increase an impressive 50 percent by 1962. And 25 percent of the growth — \$675 millions worth — will be the result of new product development.

Setterstrom based his forecasts on the present research expenditures of industrial, private and governmental agencies, as well as on expected major research breakthroughs.

One such breakthrough pointed out was in the area of brain chemistry. "There are now indications that schizophrenia, acute depression, compulsive alcoholism, and other so-called mental diseases are organic in nature and that they can be treated with chemical compounds."

Other important areas for future development are hypertension, coronary disease, arteriosclerosis, and geriatrics. Setterstrom pointed out that "as the acute diseases are con-

trolled, the chronic diseases will get progressively more attention. Today the chronic patients comprise only 10 to 25 percent of the average general practitioner's practice," he said. "By 1962, these percentages may double."

Other increases predicted for 1962: chemicals sold to the farmer, 32 percent; and a 28 percent increase in chemicals sold to the food industry.

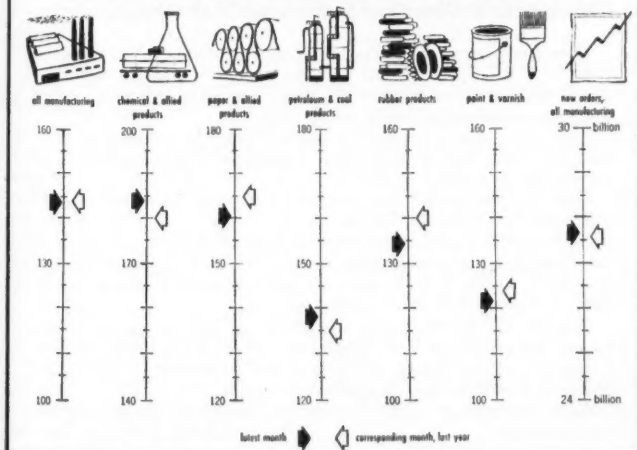
More scientists needed

For a typical company whose US sales of \$100 million annually are divided between drugs, agricultural chemicals and food additives in the ratio of 2:1:1, these predictions point to 1962 sales of about \$140 million. If earnings are proportional to sales, and price earnings ratios remain constant, the stock price will increase 40 percent.

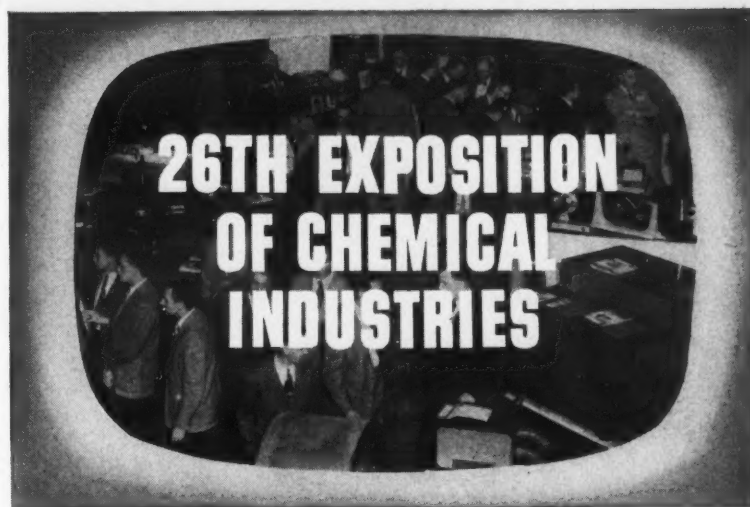
And if research expenditures are kept at five percent, an additional 80 scientists will have been added to the research department. And this, he predicted, will mean requirements of a total of 2000 additional research scientists in the drug field.

chemical business INDEX

Production indices, from latest available Federal Reserve Board figures, based on 1947-49=100. New Orders, All Manufacturing, (last column) from latest available Department of Commerce data.



Tune in on *What's New* at the



NEW YORK COLISEUM December 2-6, 1957

Four full floors of fact-filled exhibits — over 500 displays, dramatizing the latest developments in the industry . . . all under one roof . . . new methods . . . new ways to cut costs. They reflect the results of the constant search for new processes, more efficient techniques and improved performance.

Make your plans now to attend with your executives, engineers, designers and chemists. You will find hundreds of new ideas in the latest developments for the chemical industries — processing equipment, materials handling and packaging, laboratory apparatus, chemicals and raw materials, controls and instruments, etc.

For your convenience, new sections have been established for displays of laboratory apparatus and supplies, chemicals and raw materials. This grouping of specific exhibits will save time in securing new and helpful information.

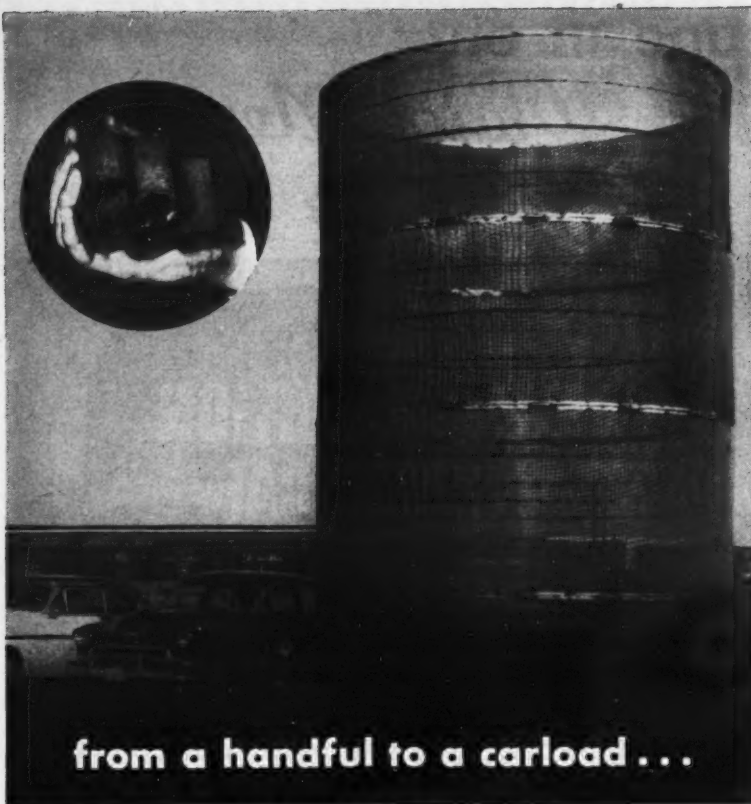
DON'T MISS the greatest concentration of new and important developments ever assembled in one convenient location. You will come away with valuable and profitable new ideas.

Reserve Time and Place Now on Your Calendar.

New York Coliseum, December 2-6, 1957 26TH EXPOSITION OF CHEMICAL INDUSTRIES

Management International Exposition Company

When inquiring check 5003A opposite last page



from a handful to a carload . . .

Cambridge offers you complete wire cloth fabrication facilities

From giant retaining screens for catalysts or filter media to small strainer assemblies for Diesel engines, fabrication of wire cloth parts to a wide variety of demands is a daily operation at Cambridge. Whatever your needs . . . filter leaves, strainers, sizing screens, retaining screens . . . you can rely on Cambridge for quality and prompt service. We'll work from your prints or draw up prints for your approval.

IF YOU BUY WIRE CLOTH IN BULK, we can give you immediate delivery from stock on large or small orders from the most frequently used types of cloths . . . from the finest to the coarsest mesh.

Accurate mesh count and uniform mesh size are assured by individual loom operation and careful inspection just before shipment.



The Cambridge Wire Cloth Company



Let us quote on your next order for wire cloth. Call your Cambridge Field Engineer—he's listed under "Wire Cloth" in your classified telephone book. Or, write direct for **FREE 90-PAGE CATALOG** and stock list giving full range of wire cloth available. Describes fabrication facilities and gives useful metallurgical data.



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CAMBRIDGE 8,
MARYLAND

OFFICES IN PRINCIPAL INDUSTRIAL CITIES

When inquiring check 5004 opposite last page

chemical
business

Marketing Trends

Titanium Prices Drop Again; Wider Competition With Stainless Closer To Reality

Close on each other's heels, both Titanium Metals and DuPont have lowered titanium sponge prices to \$2.25 a pound, 50 cents closer to the \$1.50 per pound which, the industry feels, would give it a market on the order of one million annual tons.

Titanium Metals led off by announcing price reductions averaging ten percent on billet, bar, wire, plate, extrusions, and non-alloy grades of sheet and strip. Two days later DuPont announced a surprising 50 cent per pound reduction in sponge prices. Titanium Metals, of course, followed suit by lowering its sponge price an equal amount.

A DuPont survey has indicated that a sponge price of somewhere between \$1.25 and \$1.50 per pound would give titanium a market possibly equal to the million tons of stainless sold annually.

Production of titanium sponge has risen steadily since the three tons produced in 1948. The year 1951 saw production of around 500 tons, over 5000 tons were produced in 1954—all selling at \$5 per pound. Then, in April of 1954, the sponge price dropped to \$4.72 and has

been shrinking ever since while production has been growing. Sponge production in 1955 was 8000 tons and in 1956 was over 10,000 tons. Estimated 1957 production is something between 16,000 and 17,000 tons.

The spectacular rise of the material has, of course, been based on its military applications . . . over half of the current production goes into making just one type of jet engine. But the current major emphasis—as well as the major problem—among titanium producers has been on gaining civilian markets. While the Air Force's aircraft programs have always comfortably

This month in Chemical Processing Magazine . . .

"Engineers must be unionized," says Joseph Amann, president of the Engineers and Scientists of America, "in order to solve the problems now facing them and to achieve proper economic and professional recognition."

Read what the head of this large independent collective bargaining group has to say about unionization for scientific manpower on page 38.

High or low tariffs? This important question is discussed by two leading authorities in this issue.

Dr. Lewis E. Lloyd, economist and head of business research for Dow, discusses how tariffs protect chemical markets. According to Dr. Lloyd, if tariffs were removed or set too low, business would migrate to foreign countries.

Sidney A. Swensrud, Chairman of the Committee for a National Trade Policy, and ex-chairman of Gulf Oil, takes the opposite view. Swensrud points out that maintenance of export trade depends upon reasonably low tariffs.

Read both sides of this highly controversial subject starting on page 30.

absorbed the bulk of titanium produced, recent cutbacks in the Defense Department's building schedules have made it apparent that new civilian markets must be developed — and developed quickly — if the industry is to keep expanding at its present rate.

Among sponge producers, only the newest, Union Carbide, has not reduced output along with the Air Force cutbacks. Carbide's contract with the Government provides a market for all titanium not sold elsewhere until February of next year.

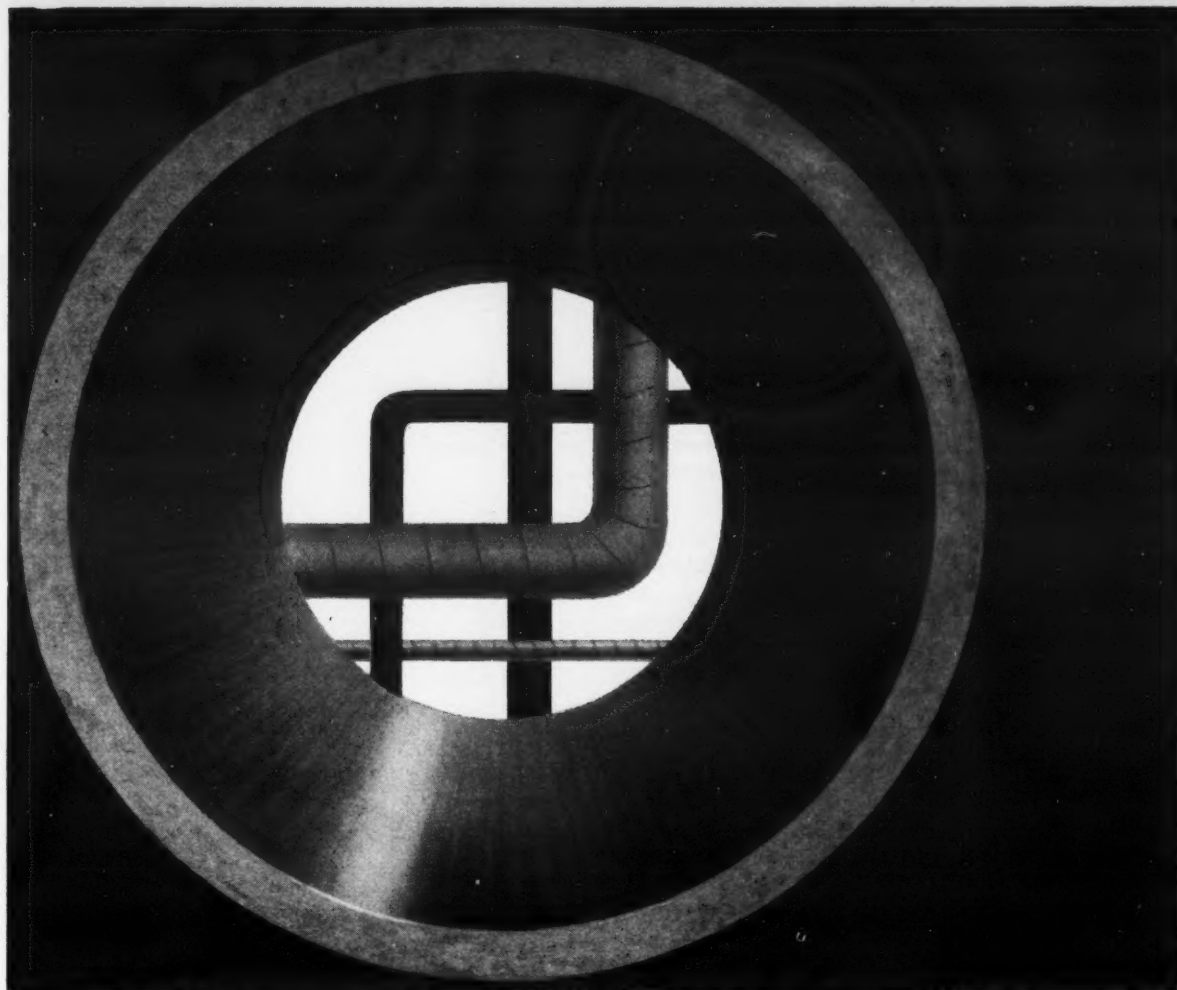
Yet, with all of the market questions, producers are looking forward to mushrooming business. And Allied-Kennecott, latest member of the titanium group, shows continuing enthusiasm to join the race. The site for A-K's operation has been chosen (a few miles outside Wilmington, N. C.) and plans call for production late in 1958.

Jefferson Forms Heavy Alkalies Division

Petrochemicals branch out as Jefferson Chemical (formed originally by Cyanamid and The Texas Company) announces formation of a new division to market caustic soda and other heavy alkalis. Moreover, Jefferson took over, last month, the sales and service in this area which was formerly handled by American Cyanamid.

At the beginning of the month, Cyanamid gave up Bill Phillips to head the new organization. At the headquarters in New York, Joseph F. Hickey and J. Beekman Fish will also be responsible for the new undertaking.

Behind the move: Production of caustic as a by-product at the new Port Neches chlorine plant to be completed next year. Petrochemicals figure heavily — the plant will produce ethylene, ethylene glycol, ethylene oxide and others.



Enjay Butyl—today's super-rubber improves pipeline protection...cuts costs!

Plicoflex® Tape Coating, revolutionary new pipeline wrapping developed by Plicoflex, Inc., combines the outstanding protective properties of Enjay Butyl Rubber with the identification properties of a color-bearing plastic film to which the Butyl is laminated. Applied over an Enjay Butyl based primer and forming a permanent bond to the metal, the tape features: absolutely no moisture migration or penetration; exceptional resistance to shock-impact; excellent dielectric properties, and outstanding resistance to normal and unusual corrosive influences. This cold-applied wrapping is safer and cheaper to apply by hand or machine than hot coatings and requires fewer personnel.

This is still another in the steadily growing number of products developed with Enjay Butyl Rubber. Contact the Enjay Company for complete information about this truly wonder rubber... where it can help you! Complete laboratory facilities, fully staffed by trained technicians, are at your service.



Pioneer in Petrochemicals

ENJAY COMPANY, INC., 15 West 51st Street, New York 19, N. Y.
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Enjay Butyl is the super-durable rubber with outstanding resistance to aging • abrasion • tear • chipping • cracking • ozone and corona • chemicals • gases • heat • cold • sunlight • moisture.

When inquiring check 5005 opposite last page

99% EFFICIENCY

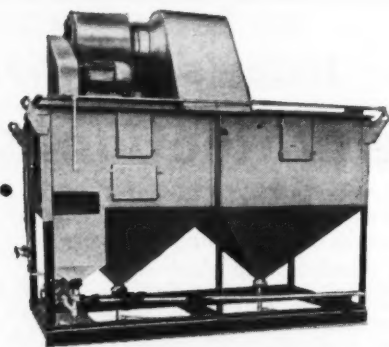
**In removal of fumes...
comparable efficiencies
In removal of sub-micron dust**

These are actual operating figures for a battery of Johnson-March Type A Hydro Precipitator Scrubbers in daily use since Spring 1956 at a large rubber reclaiming plant.*

Dust concentration in stack discharge has been reduced to an insignificant 0.015 grain per cubic foot. Unpleasant odors and vaporized oils, which once fouled the atmosphere of the surrounding community, have been literally washed away. As a matter of fact, the Johnson-March Scrubbers have permitted the profitable use of recovered oils in the plant's processing operations.

If dust, fumes or odors are problem by-products of your plant, Johnson-March engineers can help you eliminate them. For a dust control survey of your operations, without obligation, call or write the Johnson-March office. Or send for Bulletin HP-955.

*Name on request.



New-model Type A Scrubbers have improved diffuser elements which produce more active gas-and-water turbulence . . . more effective precipitation of sub-micron dust.

Johnson March

DUST CONTROL ENGINEERS

1724 Chestnut Street, Philadelphia 3, Pa.

CANADIAN REPRESENTATIVES: G. F. Sterne and Sons, Ltd., Brantford, Ontario
When inquiring check 5006 opposite last page

**chemical
business**

Our Growing Industry

New Plant Puts Scientific Design In The Catalyst Business

A new venture has put Scientific Design Co., Inc., in the catalyst producing field. The plant, located in northern New Jersey, will be producing on a commercial scale catalysts for processes developed by SD. Initially, the recently completed plant will make silver catalyst for SD's ethylene oxide process. Eventually catalysts for other SD processes and custom catalysts will be part of the production program.

With its entry into the catalyst field, Scientific Design will now be able to offer another service to their licensees. Since 1953, Naphtachimie in France had been manufacturing the catalysts.

Manufacturing operations will be continued in a single story building with 8500 sq ft of space. Completely instrumented, the plant is overdesigned to handle doubled capacities with small additions.

Two New Plants For Heyden Newport

Development of an entirely new catalytic process has led Heyden Newport to build a plant for salicylaldehyde at Fords, New Jersey. On the strength of its use in dye-stuffs, odor bases, and petroleum additives it can look forward to a healthy market. Regardless of this, Heyden Newport president **Simon Askin** pointed to an added advantage: no by-product problems for the new process.

In explaining the new move, Askin called salicylaldehyde "a logical addition" to the present product line.

Scheduling calls for completion of the new plant early next year — and already provisions for expansion are on the boards.

Methyl isopropyl catechol is another Heyden Newport project. October of this year is the target date for a plant at Pensacola to produce half a million pounds a year. Only major use for the product is as a stabilizer for synthetic rubber. Reinforcing this, however, is its potential for a widespread market as an anti-oxidant for vegetable oils, gasoline, and other petroleum products. Expansion will follow in this turpentine-derivative chemical field, Askin noted, through development projects which the company's new lab will turn up.

New Polyester Plant For Witco

Witco has put into operation a new plant for production of raw materials for urethane foams. Witco has emphasized they have no plans for production of the foams themselves but will specialize in preparation of component materials. Future plans of the company call for production of raw materials for rigid structure as well as a hydrophilic polyester.

New Research Lab For DuPont

DuPont's Electrochemicals Dept., Niagara Falls, N. Y., will be getting a new research lab sometime in fall of 1958. The \$2.5 million facility will be the center of research and development work of products and processes related to the department's established business in sodium, vinyl products, peroxygen compounds, and adiponitrile.

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Goodrich Completes \$1.5 Million Development Center

* Describing it as one of the nation's largest centers for synthetic rubber and rubber chemicals, Goodrich Chemical has announced the completion of its new Avon Lake, Ohio, experimental station.

The \$1.5 million center will employ about 100 people, has both lab and processing facilities.

Third Teflon Expansion Since 1950

DuPont's planned expansion of Teflon resins production is the company's third major expansion since its first commercial unit began operation in 1950. The new Washington Works, Parkersburg, W. Va., will account for a 100 percent increase in production of Teflon 6 and Teflon 30 by late 1957 and for a 30 percent increase in Teflon 1 and Teflon 5 by mid-1958.

Airco Building Polymer Lab

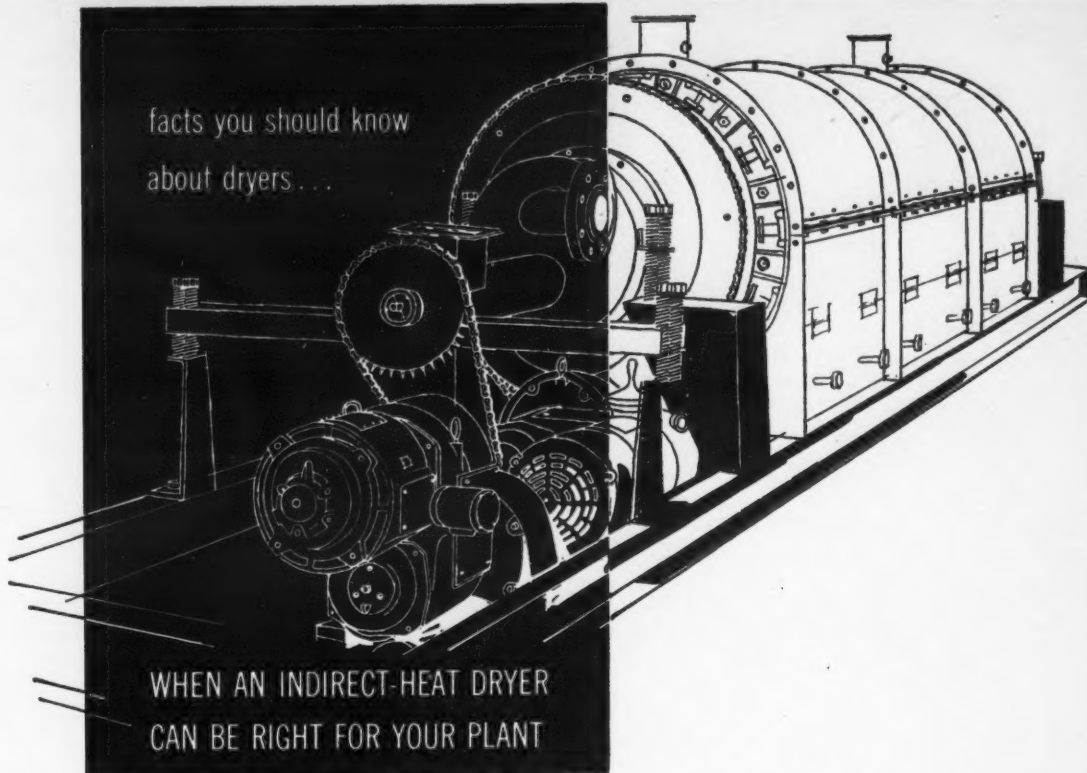
Murray Hill, N. J., was the scene of ground-breaking ceremonies for Airco's half-million-dollar polymer laboratory. The two-story



Aerial view of Airco's half-million-dollar polymer lab

building will be completed by the end of 1957 and will be devoted to development of polymers primarily for paints, adhesives, plastics, and coatings.

facts you should know
about dryers...



WHEN AN INDIRECT-HEAT DRYER
CAN BE RIGHT FOR YOUR PLANT

For over 55 years, Louisville Dryers have been solving industry's drying problems and effecting marked economies. The records of this experience can often be applied to specific cases, possibly yours. For example...

Q. My material is a filter cake, practically all minus 325 mesh, and must not contact furnace gases. It can be heated to 500° F. at least, without injury. What type of dryer would do the job best?

A. You might consider using a direct-heat rotary dryer that utilizes clean, heated air as the drying medium—air heated by steam coils or a gas or oil fired heat exchanger. However, this introduces a considerable dust collection problem. Besides, from a standpoint of capacity, it is inefficient as well as from a heat-cost standpoint. This makes it unduly expensive. Therefore, a type of indirect-heat rotary dryer is indicated which would greatly reduce both the

dust problem and the heat cost.

Q. What is meant by an indirect-heat rotary dryer?

A. One in which the material to be dried is warmed by contact with the heated metal surfaces, which in turn are heated by the medium used (usually furnace gases or steam). Those using furnace gases are called "indirect fire dryers". Atmospheric and vacuum drum dryers are examples of steam-heated indirect dryers, but the type in greatest use is the steam tube dryer. This is often referred to as the "Louisville Type" because of the thousands of Louisville Steam Tube Dryers built during the past 55 years.

Q. How does an indirect-heat dryer minimize the dust problem?

A. In an indirect-heat dryer, only enough air is admitted to carry off the evaporated moisture. Thus, the air has nothing to do with the heating

of the material. Generally, this low air velocity results in insignificant dust loss.

Q. How does this differ from the operation of a direct-heat dryer?

A. In direct-heat dryers, the hot air furnishes the heat for drying besides removing the evaporated moisture. The amount needed to supply the necessary heat results in a sufficiently high velocity through the dryer to carry out an excessive amount of fine material particles.

Q. It seems I need an indirect-heat dryer. How can I get competent advice and more information regarding my particular requirements?

A. The Louisville Dryer engineering staff will be glad to analyze your requirements, arrange for necessary pilot plant tests, and submit an unbiased recommendation accompanied by estimated costs. You incur no obligation by using this service.



LOUISVILLE DRYING MACHINERY UNIT

GENERAL AMERICAN TRANSPORTATION CORPORATION

Dryer General Sales Office: 139 So. Fourth Street, Louisville 2, Kentucky

Eastern Sales Office: 380 Madison Avenue, New York 17, New York

In Canada: Canadian Locomotive Company, Ltd., Kingston, Ontario, Canada

General Offices: 135 S. La Salle Street, Chicago 90, Illinois

When inquiring check 5007 opposite last page



INTENT CRAFTSMEN

ALLOY DIVISION

GRAVER

GRAVER TANK & MFG. CO., INC.

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PITTSBURGH • DETROIT • CHICAGO • TULSA • SANDS SPRINGS, OKLAHOMA
HOUSTON • LOS ANGELES • FONTANA, CALIFORNIA • SAN FRANCISCO

Quality craftsmanship is amply demonstrated by Graver skills with automatic aluminum welding equal to ASME X-ray standards. Graver's advanced welding techniques are among the reasons Graver is called upon regularly to fabricate aluminum, alloys and carbon steel into a variety of shop-built and field-erected pressure vessels and storage tanks. It will pay you to inquire about how Graver craftsmanship and experience can be valuable to you, too.

When inquiring check 5008 opposite last page

Victor Plans \$1.5 Million Organic Chemicals Plant

Victor Chemical has chosen Mount Pleasant, Tenn., as the site of its new organic chemicals operation which it will begin building within a few weeks.

Original cost of the multi-unit plant will be in the neighborhood of \$750,000, and planned expansion will eventually boost the cost to \$1.5 million.

While the company declined to disclose what materials will be produced, it is presumed that they will be primarily organic phosphorus compounds.

p-Xylene Means New Plant For Cal Standard

Standard of California is adding capacity for 25 million pounds a year of para-xylene. To be located next to the present unit on San Francisco bay (in Richmond) the new unit should be producing next year.

Fibers and plastic packaging materials called for the hike in production.

Double Cuprous Chloride Production

Berkley Chemical Corp., Berkley Heights, N. J., has completed facilities which will double present capacity for producing cuprous chloride. The new plant has been engineered to handle another 100 percent increase in production should it be necessary.

Consulting Firm Opens Latin American Office

Roger Williams Technical & Economic Services, Princeton, N. J., has opened offices in Havana, Cuba. The new offices will be handling consulting chemical market research and economic studies throughout the Latin American area.

CHEMICAL PROCESSING

chemical business

Spotlight on people

American Mineral Spirits Company elects **Leon J. Breton** assistant vice president. Prior to his election, Breton served the company as manager of market research and development.

At Olin Mathieson . . . **W. F. Otterstrom** moves up to post of comptroller, position vacated by **R. B. Lewis's** resignation. Lewis will continue as consultant to the corporation until the 15th of this month.

Thomas M. Ware, administrative v-p of International Minerals and Chemical Corporation, Chicago, is elected director of the company.

Newly appointed vice president of Ohio Chemical & Surgical Equipment Co., division of Air Reduction, is **W. A. Lunger**. Lunger will succeed **R. E. Lenhard** who is promoted to executive vice president of Air Reduction Sales Company, Airco's major division.



Ware

Robert M. Magness is named assistant to the manager of heavy chemicals sales for USI, division of National Distillers and Chemical Corporation.

Pennsalt Chemicals appoints **George T. Collins** to direct operations of its subsidiary, Pennsalt International Corporation.

Haynes Stellite, division of Union Carbide, announces the appointment of **Robert M. Briney** as president.



Haude

W. R. Grace appoints **William J. Haude** president of Grace Chemical division.

George W. Schnier, previously sales manager of American Potash & Chemical's refrigeration chemicals department, is named head of new chemical fuels section. And **Dr. John L. Bills** joins the company to head its new market research section in the market development department.

William J. McKeehan is made assistant secretary of Allied Chemical & Dye Corporation.

With the retirement of **William S. Richardson**, **J. W. Keener** becomes president of B. F. Goodrich Company. Keener is also made a director of company and member of executive committee.

Robert W. Crabtree, manager of nitrogen product sales for Hercules' explosives department, is named manager of chemical sales, a newly created post.

Erwin A. Olson and **James C. Konen** of Archer-Daniels-Midland are elected to the board of Applied Radiation Corporation.

Elections at 3M . . . **Joseph C. Duke** is made executive vice president in charge of coated abrasives and adhesives and coatings while **Bert S. Cross** is new executive vice president in charge of graphic products.



Keener



Blueprint of Chicagoland Economic Opportunities

What industrial plant sites are available in Chicago and Chicago Heights? Where are they located in respect to transportation, shipping and other facilities? What materials are plentiful? What is the labor situation? What about housing—and schools?

This new book, "Chicago & Chicago Heights Industrial Economic Blueprint," has been published to answer these questions and many more. With maps, diagrams, charts, photographs and text, it gives you a detailed analysis of the area and its physical characteristics. Here are easy-to-grasp facts about population, labor force, raw materials, transportation, utility and business services. The significant figures covering some eighty-service classifications of manufacturing industries are tabulated for quick reference.

"The amount of detail work that went into the preparation of these reports is truly amazing. In all the years in which we have been engaged in plant location work we have never seen so much data collected on a particular area."—from a letter describing previous economic studies by Chicago & Eastern Illinois Railroad.

Available without charge. For a complimentary copy of "Chicago & Chicago Heights Industrial Economic Blueprint," write Mr. H. Sampson, Vice-President, Chicago & Eastern Illinois Railroad, 332 South Michigan Avenue, Chicago 4, Illinois.



Chicago & Eastern Illinois Railroad

When inquiring check 5008A opposite last page

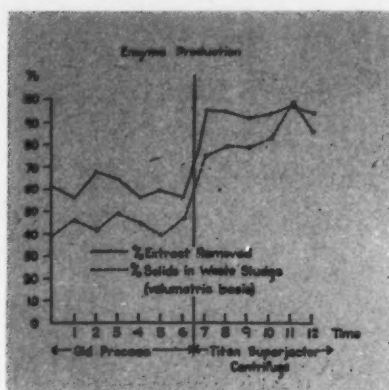


Chart shows percent extract removed and percent sludge remaining before and after centrifuge was installed

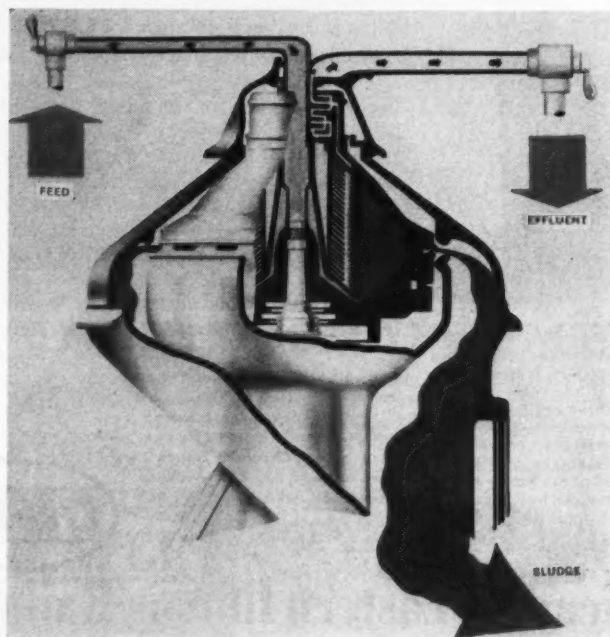
Lederle Laboratories finds that by simultaneously removing solids heavier and lighter than liquid . . .

centrifugal separation boosts enzyme production 140%

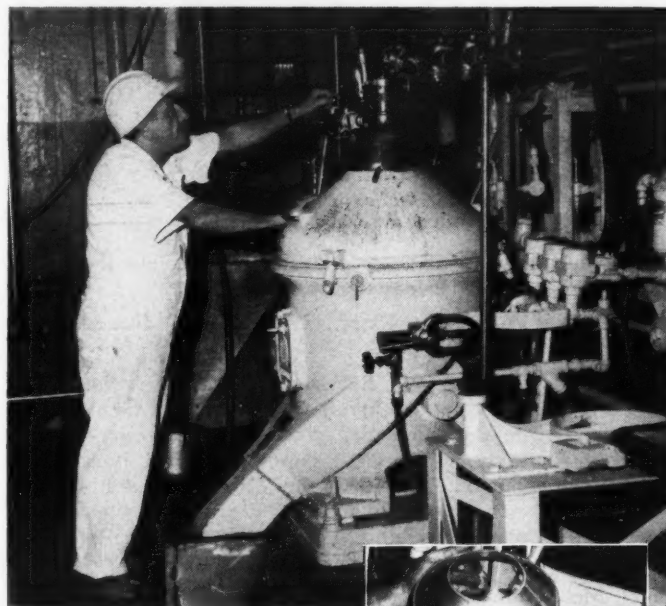
TED F. MEINHOLD, Associate Editor
with **LESTER O. OLSEN**, Department Engineer,
Enzyme Production Department
Lederle Laboratories Division
American Cyanamid Company, Pearl River, New York

PROBLEM: In order to produce a new enzyme compound economically in commercial quantities, Lederle Laboratories Division of American Cyanamid Company, Pearl River, New York, had to find an efficient way of separating it. Problem was to find the best possible means of recovering as large a proportion of liquid as possible from a slurry containing 15 to 50% solids. The separation was complicated by presence of solids both lighter and heavier than the liquid.

When originally produced in small quantities, isolation of the enzyme compound was accomplished by a laborious method. Two men would filter the slurry through a cloth container, by simply twisting one end in opposition to the other. This was tedious, time-consuming, and not conducive to good housekeeping. An extensive cleanup period was required after each batch. Operation was wasteful, too, since some of the valuable extract was absorbed by the cloth and could

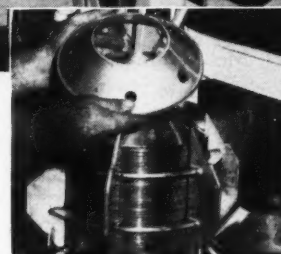


Unit is deslugged in matter of seconds when slots around bowl's circumference are opened



(Above) Centrifuge performs difficult separation in enzyme production at Lederle Laboratories

(Right) unit is dismantled for cleaning and lubrication on the average of once a month. Vanes around disc reduce turbulence of sludge in bowl and improve separation



not be reclaimed.

Following the squeezing operation, gravity filters were needed to further separate the light solids from the extract. These soaked up more of the costly extract, including some solids. The filters were inexpensive, but large numbers were used in an effort to purge the extract of as

much solid material as possible. Disposal of filters was a problem, too. The soggy units had to be transported to a special disposal area to be burned. Reward for all this labor was about 25 gallons of extract per hour.

Solution: Engineers decided that centrifuges, if they would not clog too easily, would offer

the best solution. After experimenting with several types they selected a continuous and self-cleaning unit. Known as a Titan Superjector, machine's design and operating principle is such that it could be modified to trap solids lighter than the liquid at center of bowl. They can then be discharged with the heavy solids.

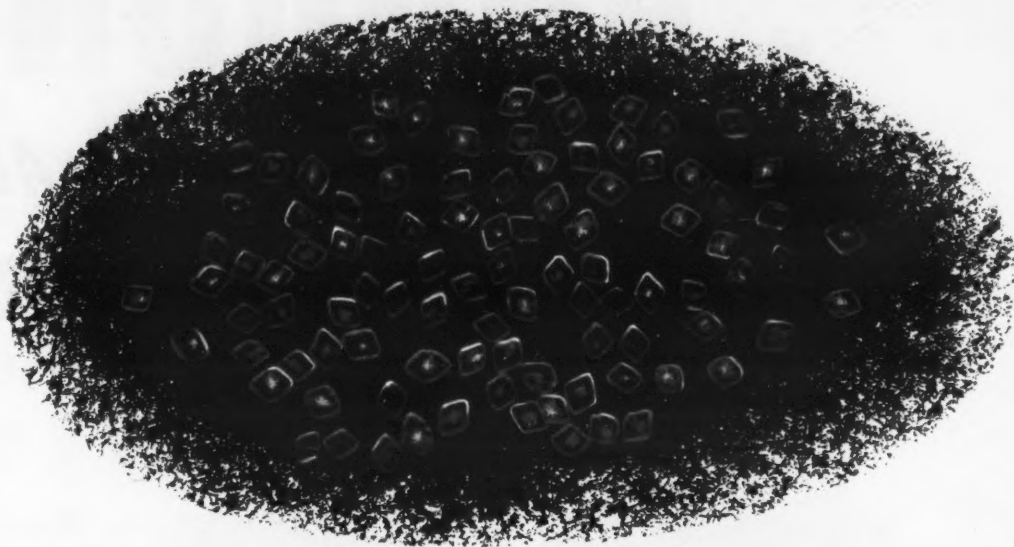
Centrifuge's basic principle is the same as conventional units. Bowl is rotated at a fixed speed, ranging from 5000 to 6500 rpm, depending on nature of separation. Liquid to be separated is introduced at top entering center tube (see drawing) and circulates down and out at lower edge so that it enters disc stack at bottom. Product then circulates upwards through aligned holes in the discs. Separation starts at the holes and is intensified by contact of the particles with underside of the discs. Liquid component is forced toward intermediate section of bowl where it is decanted continuously through outlet at top of centrifuge.

Unit has settling vanes around outer part of bowl. Heavier component collects between these. Slots $\frac{3}{8}$ " high and 5" long are in the sidewall of the bowl. These are opened periodically by automatic controls. This completely desludges unit in matter of seconds. Centrifuge is also furnished with a timer that activates a $1\frac{1}{2}$ " water valve to displace mother liquor from bowl prior to desludging. Machine is hermetically sealed, and has a stainless steel bowl.

Results: Use of the centrifuge has boosted output of enzyme extract from 25 to 60 gph — an increase of 140%. Labor has been cut by at least 50%, only one man being required part time to operate the unit. Materials such as the cloth tubes and filters are no longer necessary, and the problem of filter disposal has been eliminated. Sludge is now pumped directly into plant's sewage system.

(Titan Superjector centrifuge was supplied by The Pfaunder Co., Dept. CP, 1000 West Avenue, Rochester 3, New York . . . or for more information check 5009 opposite last page.)

IF YOU WANT TO MAKE A CRYSTALLINE PRODUCT LIKE THIS—



STEP-UP QUALITY AND UNIFORMITY WITH A



Struthers Wells pioneered controlled crystallization and today offers you the greatest wealth of experience available in the design and fabrication of high efficiency crystallization equipment.

You can be sure of controlled crystal size, uniform crystals and high purity PLUS operating efficiencies and economies throughout the process. As testimony, more than 500 crystallizers in operation are producing a wide variety of superior crystalline products, representing a broad cross-section of chemicals produced in this country.

For your crystallization processes, call on the know-how of Struthers Wells Crystallization Staff. Laboratory or Pilot plant tests are at your disposal. For basic facts, WRITE for Bulletin No. 50A.

STRUTHERS WELLS PRODUCTS

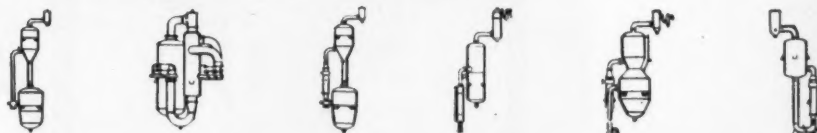
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When inquiring check 5010 opposite last page

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ALL NEW

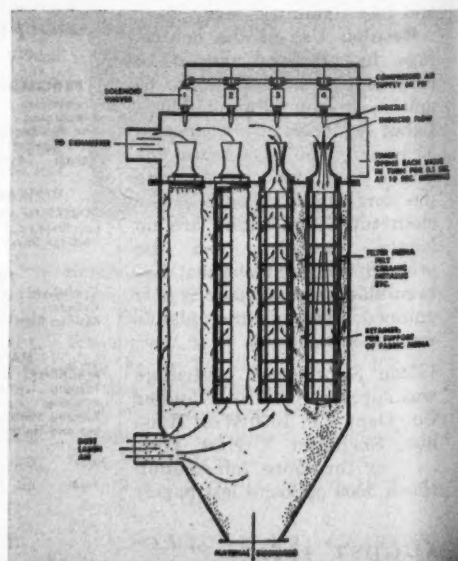
JET-ACTION



**NO INTERNAL
MOVING PARTS!
MAXIMUM OUTPUT!
MINIMUM
MAINTENANCE!**

THE MODEL 9-4 MIKRO-PULSAIRE COLLECTOR has 42 sq. ft. of filter area, and is capable of operation at approximately the same filter ratios as conventional bag type dust collectors. Unit handles between 400 and 600 cfm of dust-laden air. MODEL 48-6 has 340 sq. ft. of filter area for capacities from 2000-5000 cfm. Units also available for intermediate and larger capacities.

Schematic diagram showing flow of dust and air and arrangement of filter cylinders in MIKRO-PULSAIRE Collector.



the first major advance in Dust Collection
in more than a decade!

MIKRO-PULSAIRE*

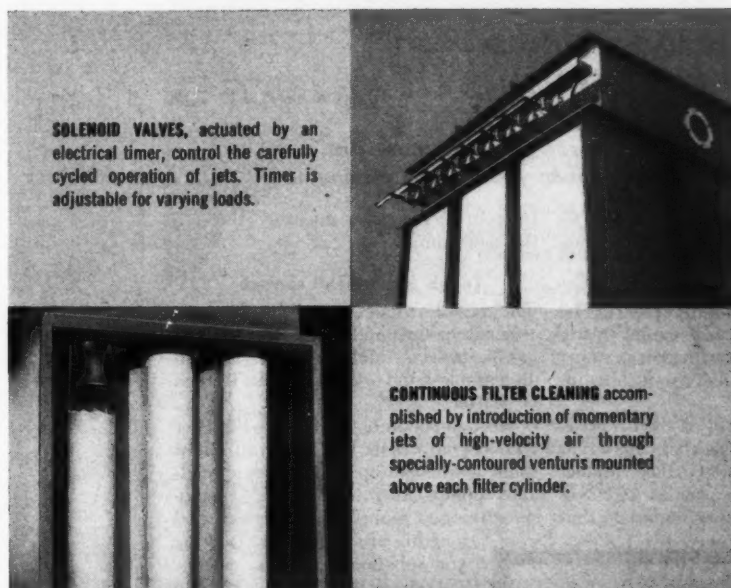
COLLECTOR

other automatic filter type collector. Efficiency of collection on one dust having 0.1 micron, ultimate particle size, averaged 99.9%+ at 50 grains per cubic ft. dust loading.

PROVED BY PERFORMANCE

One field test MIKRO-PULSAIRE Collector unit accumulated more than 3,000 hours of running time, operating on ground gypsum dust *without a single failure!* This unit replaced a conventional fabric type dust collector in which bag life had averaged only ten days. In contrast, the MIKRO-PULSAIRE received *no maintenance* in over 5 months of 24-hour, six-day-a-week operation!

For more complete information on the MIKRO-PULSAIRE Collector write for Bulletin 52A. In addition, we will be glad to make specific recommendations regarding your particular application requirements.



SOLENOID VALVES, actuated by an electrical timer, control the carefully cycled operation of jets. Timer is adjustable for varying loads.

CONTINUOUS FILTER CLEANING accomplished by introduction of momentary jets of high-velocity air through specially-contoured venturis mounted above each filter cylinder.

ADVANTAGES OF THE MIKRO-PULSAIRE COLLECTOR

- No internal moving parts
- No lubrication on Collector
- High efficiency 99.9%+
- Longer bag life
- Maintenance practically nil
- Handles high dust loads
- Continuous automatic cleaning
- Uniform pressure drop
- Constant air flow
- Minimum cleaning air required
- High filter ratio
- Compact design

*Patents applied for.

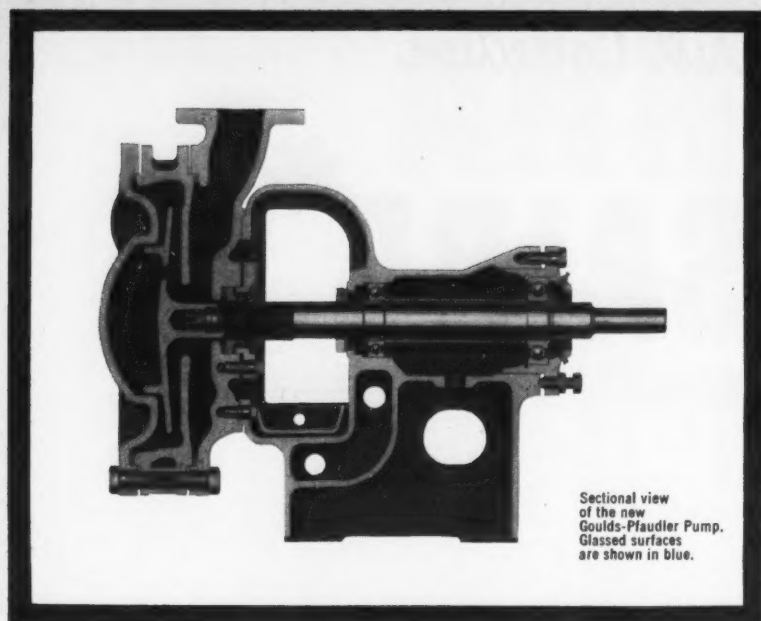
Mikro-D

PULVERIZING MACHINERY DIVISION
METALS DISINTEGRATING COMPANY, INC.

60 Chatham Road • Summit, New Jersey

For more information on product at left, specify 5012 see information request blank opposite last page.





Sectional view of the new Goulds-Pfaunder Pump. Glassed surfaces are shown in blue.

...pump corrosives in glass

New Goulds-Pfaunder glassed pump handles acids, alkalies for years... costs less than you may be paying now

Here's a centrifugal pump that lasts for years handling the most corrosive chemicals.

All liquid-contacting parts on this new Goulds-Pfaunder pump are glassed. This glass is resistant to all acids except hydrofluoric up to 212° F. and higher in many cases, as well as to many mild alkaline solutions.

Besides getting superior corrosion resistance, you can handle sticky materials better, too, with the Goulds-Pfaunder glassed pump. Many plastics and synthetic rubbers and other materials that

cling to metal, flow smoothly through this new pump.

Tough glass-metal surface

The glassed surfaces are tough—the powerful mechanical and chemical interlocking of the glass and metal provides an inseparable bond—the glass can't crack or shatter!

Most important, the Goulds-Pfaunder glassed pump costs less than you might think; less for example, than some special-alloy pumps. If you're pumping corrosives, this new pump's high efficiency and long life are almost sure to bring you substantial savings.

Four sizes offer capacities to 700 GPM, heads to 140 ft. For complete information, send now for Bulletin 725.2.

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Seneca Falls, New York

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West Coast Representative: GOULDS PUMPS Western, Inc., 1919 N.W. Thurman St., Portland 9, Oregon
In Canada: The A. R. Williams Machinery Co., Ltd. . . . in all principal cities

When inquiring check 5013 opposite last page

NEW SOLUTIONS of processing problems



Feeder has pumped 93% sulfuric acid for over two years without trouble

Small feeder with Hypalon diaphragm stops check valve troubles in chlorine plant and . . .

TED F. MEINHOLD, Associate Editor
With **JAMES C. HADFIELD**, General Manager
Fields Point Manufacturing Corporation
Chemical Division, Providence, Rhode Island

Problem: Check valves on mercury diaphragm-type metering pump lasted only about 3-6 months before they had to be replaced at the chlorine plant of Fields Point Manufacturing Corporation, Providence, Rhode Island. Pump was feeding 93% sulfuric acid, against 30 ft head, at rate of 3 gph, into 30-in diameter ceramic-type chlorine gas drying tower.

The constant wear of the mercury against the metal check valves was such, that after 3-6 months, the checks would no longer seat properly. This caused pump to fail and made it necessary to feed the acid by means of air pres-

sure — which invariably resulted in excessive consumption of acid. Many types of check valves were tried, but none worked out.

Since drying tower handles over 40,000 cu ft chlorine per hr, it was important to keep the acid flowing. Failure to do so could result in serious damage to the large vacuum pump serving the chlorine processing system. Plant operates 24 hr per day, so pump had to be watched closely.

Solution: Company replaced the old pump with a small diaphragm feeder having a Hypalon diaphragm. Powered by a 1725 rpm, ¼-hp electric motor and 50:1 reducer, unit can

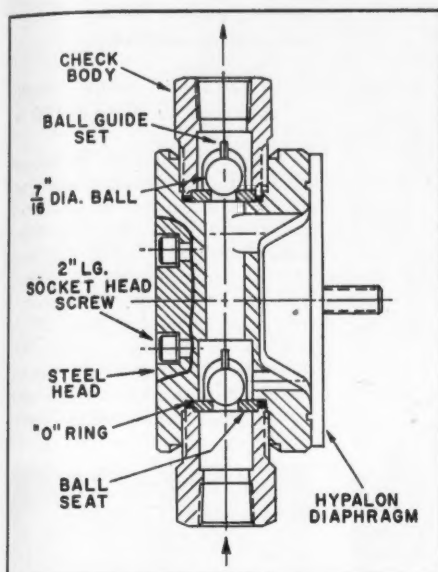
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Drawing shows location of check valves and Hypalon diaphragm in feeder's head

meters sulfuric acid accurately and reliably

deliver 6.19 gph — if necessary. Feed rate is regulated by adjusting either stroke length or stroking rate. Feeder has steel head and check valves and needs no attention beyond an occasional inspection of speed reducer oil level, and of valve and diaphragm action.

Results: Problem of replacing check valves has been eliminated by the new feeder. Unit has given continuous

service for over 2 years (24 hr per day, 7 days per week) without trouble. Maintenance has been negligible. As a precautionary measure, Hypalon diaphragm is inspected every 6 months.

(Model HDM diaphragm feeder is manufactured by Proportioners, Inc., Division of B-I-F Industries, Inc., Dept. CP, 345 Harris Avenue, Providence 1, Rhode Island. Check 5014 opposite last page.)



Feeder needs no attention beyond an occasional inspection of speed reducer oil level, and valve and diaphragm action



New ACE RIVICLOR® Corrosion-resistant plastic piping

RIVICLOR, newest of all rigid plastic pipe, heads the list for resistance to chemicals and excellent aging characteristics . . . plus high strength, toughness and easy workability.

Riviclор is unplasticized polyvinyl chloride, specially formulated for process piping. Non-toxic, non-flammable, excellent insulating properties. Only half weight of aluminum. Never needs painting. Smooth inner surfaces give you high flow rates with low loss of head.

Use Riviclор for all in-plant piping of mild or strong corrosives at normal temperatures . . . for liquid lines where "sweating" or corrosive vapors are problems . . . for underground piping. Pipe, fittings, diaphragm valves from 1/2" to 2".

Ask for Technical Bulletin CE-56.

Approved
For Use
With
Drinking
Water



ABBREVIATED TABLE OF CHEMICAL RESISTANCE

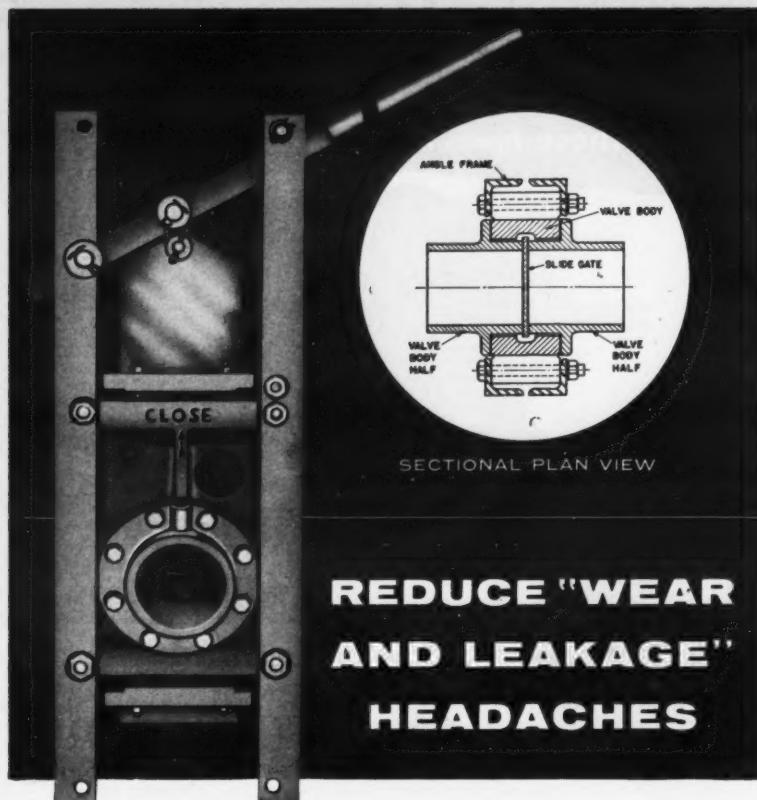
ACIDS		BASES		MISCELLANEOUS			
Acetic 50%	S	Ammonium Hydroxide 28%	S	Ethyl Alcohol	S	Carbon Tetrachloride	S
Chromic 25%	S	Sodium Hydroxide 50%	S	Methyl Ethyl Ketone	U	Plating Solutions	S
Hydrochloric 38%	S	HALOGENS		Gasoline	S	Photographic Solutions	S
Hydrofluoric 50%	L	Sodium Chloride Sat.	S	Mineral Oil	S		
Nitric 20%	S	Ferric Chloride	S	Animal Oil	S	KEY: S—Satisfactory	
Sulphuric 50%	S	Sodium Hypochlorite 5%	S	Vegetable Oil	S	L—Limited to certain applications	
Sulphuric 98%	S			Phenol 10%	S	U—Unsuitable	
				Chlorine 5%	L		
				Alum	S		



ACE processing equipment of rubber and plastics

AMERICAN HARD RUBBER COMPANY
Ace Avenue • Butler, New Jersey
DIVISION OF AMERACE CORPORATION

When inquiring check 5015 opposite last page



SECTIONAL PLAN VIEW

REDUCE "WEAR AND LEAKAGE" HEADACHES

in pipelines transporting solid materials in liquids, air or gases

You can depend upon the A-S-H Universal Slide Valve

- to minimize leakage past the gate, when closed and the system is under pressure in either direction;
- to give unrestricted flow without turbulence when open.

The A-S-H Universal Slide Valve can be depended upon to reduce your "wear and leakage" headaches because it is the *only* type valve in which the gate *always* covers the seat—solids *cannot* impinge on the seat.

If you use flap-type gate valves or plug valves to direct flow, isolate equipment or pipelines, or cut off gravity chutes, hoppers or bins, you've probably experienced the problems of excessive wear and leakage. Your first step towards eliminating these headaches is to write for our new Data Sheet Ue. It gives complete information about manual and power operated A-S-H Universal Slide Valves—another A-S-H Engineered Component for the processing industries.



the **Allen-Sherman-Hoff** company
257 E. Lancaster Ave., Wynnewood, Pa.
Offices and representatives in principal cities
MATERIALS HANDLING EQUIPMENT

When inquiring check 5016 opposite last page

NEW SOLUTIONS of processing problems

**Save weight, up to 50%,
with expansion joint
at Texas Butadiene**

A 50% saving in weight, better equalization of movement, and longer cyclic life are advantages gained by Texas Butadiene and Chemical Corp., Lyondell, Texas, with new-design expansion



Portion of 48"-diameter regeneration-air line at Texas Butadiene and Chemical Corp.

joints. Ranging in size from 14 to 72", joints have careful correlation between shape, size, height, and pitch of corrugations which results in lower flexing stresses and increased flexibility.

(Series 50 expansion joints were supplied by Badger Manufacturing Co., Dept. CP, 230 Bent St., Cambridge, Mass. . . . or for more information check 5017 on the convenient Reader Service slip opposite last page.)

FOR MORE INFORMATION

Here's what to do when you want additional details about products and services mentioned in this issue's editorial articles or advertisements.

Note the number at end of article or advertisement. Check this key number on Reader Service Slip opposite last page of this issue. Fill in Slip with the other pertinent information (name, title, company, address, product made). Mail to our Reader Service Department.

We'll contact the manufacturer for you. He'll send you the details direct.

**Adjustable-speed drive
stops product waste
on printer-slotter**

Wide-speed range available, ups production 100%

Problem: Loss of 18 boxes resulted whenever conveyor for printer-slotter at Midland Container Corp., Racine, Wis., was stopped using pulley drive. Machine slots, trims, and prints corrugated containers ranging in size from 10 to 110 sq in. Because a number of different sizes were run in single day, numerous set-ups with stops and starts were



Production speed can be controlled with turn of a dial

necessary. Drive had only one speed, required cranking to start and considerable maintenance.

Solution: In April 1956 company installed a DC adjustable-speed drive system consisting of a control panel, conversion unit and 20-hp DC-drive motor. Conversion unit contains motor-generator set which converts incoming AC to DC and supplies it to DC-drive motor. Separate operator's control station is used to control armature voltage for speed control.

Results: Machine can be stopped with loss of only one box and can be brought to operating speed at the push of a button. Time saved in starting and stopping and range of speed available has permitted Midland Container to increase production 100%. Printer-slotter can turn out 14,000 containers per hour at top speed, or as few as 3000 per hour. Only minimum maintenance is required.

(Speed Variator is a product of Motor and Generator Department, General Electric Co., Dept. CP, Erie, Pa. Check 5018 opposite last page.)

Refractory Castables are **SPECIALIZED**

Which are best to use in refinery units?

Naturally, the type of refractory castable selected depends upon the specific service. B&W makes a line of specialized refractory castables which are being widely used in catalytic reformers and catalytic cracking units, as well as in furnaces, ducts and stacks. For easy reference, here are some typical applications together with the recommended B&W Refractory Castables:

APPLICATION	DESIRABLE PROPERTIES	RECOMMENDED B&W CASTABLES
Linings of catalytic reformers	Extremely low iron content, extra high strength.	Kaocrete LI
	Extremely low iron content, plus good insulation.	Kaolite LI
	Low iron content, high temperature use limit.	Kaocast
Lining desulphurizers	Good workability	Kaocrete B
Transfer lines and regenerators of catalytic cracking units	Extra abrasion and erosion resistance.	Kaocrete D
Heads of reactors and regenerators	Plasticity, excellent workability.	Kaocrete B
Insulating furnace floors	Good insulation, light weight	Kaolite-20 Kaolite-22
Tube sheets	Good insulation, light weight	Kaolite-20 Kaolite-22
Burner blocks	High temperature use limit, refractoriness and spalling resistance.	Kaocast
Openings where doors and other points are subject to mechanical abuse	Extra abrasion and erosion resistance	Kaocrete D
Furnace doors	Good insulation, light weight	Kaolite-20 Kaolite-22
Ducts and stacks	Good insulation, light weight	Kaolite-20

For
more information
on product at
right, specify 5019
see information
request blank
opposite last page.



Bulletin R-35 contains additional information on
B&W Refractory Castables. Send for your copy.

B&W REFRACTORIES PRODUCTS: B&W Allmul Firebrick • B&W 80
Firebrick • B&W Junior Firebrick • B&W Insulating Firebrick • B&W
Refractory Castables, Plastics and Mortars • B&W Silicon Carbide





GLYCERINE

Dystrip, developed by Ulano Products Co., in conjunction with the U. S. Air Force.

Topographical maps In minutes instead of hours

Glycerine is the plasticizer in a new process for making area color separations and negatives. Government map makers report that the new process effects time savings of as much as 60 to 1 in preparing maps for reproduction.

In the new process, a plastic sheet is sensitized and contact printed. The sheet then is plasticized with Glycerine, allowing line-bounded areas to be stripped out easily. Dyeing converts the image into an opaque color separation.

Glycerine has also found application in more conventional reproduction processes. It is widely used as a plasticizer for printing ink resins and as a humectant in stamp pads.

Glycerine's usefulness continues to grow. Stable in price, dependable in supply, Glycerine offers processors a unique balance of properties: It is hygroscopic, nontoxic, stable, nonvolatile, with excellent solvent power and agreeable taste. New applications for Glycerine are extending its use in paints, foods, pharmaceuticals, packaging and many other fields. For a useful 20-page booklet, "Glycerine Properties and Uses," write to:

Glycerine Producers' Association

293 Madison Avenue, New York 17, N. Y.

Nothing takes the place of Glycerine

When inquiring check 5020 opposite last page

NEW SOLUTIONS

**Acid truckers save \$\$\$,
achieve peace of mind
with Hypalon valve**

Replacements unnecessary
after more than two years

Problem: Operators of fleet of tank trucks for hauling away spent acid, Industrial Wastes Inc., Beaver Falls, Pa., did not have a satisfactory valve for handling sulfuric, nitric, hydrochloric, and hydrofluoric acids.

Many different valve designs had been tried, each failing in some respect. The most satisfactory valve had several disadvantages. It weighed 250 lb, making it cumbersome to install, and requiring special supporting



Hypalon-lined butterfly valve is
self-cleaning, fast-discharging—
forms pressure-tight seal

members to prevent stress fatigue in tank shell. Sediment frequently plugged it. A special rodding-out hole had to be made in top of each tank, directly above valve. This rodding procedure delayed operations and, in time, damaged tank linings.

Solution: About two years ago a Hypalon-lined butterfly valve was tried. The 6" valve weighs less than 30 lb, is self-cleaning, discharges faster, and costs only about 60% as much as previous valves.

Design incorporates an acid-resistant metal damper which rotates in ring-piece lined with Hypalon sleeve, slightly smaller in diameter than damper. When closed, metal disc squeezes tightly

Turn to page 72

CHEMICAL PROCESSING

How To Save Money On OUTSIDE RED HOUSE & BARN PAINT FORMULATIONS



By proper selection of Pure Red Iron Oxide pigments and extenders, pigment-volume ratio can be increased, fading and color losses retarded, and general durability improved.

Exposure tests on our fences as long as 7 years clearly indicate the improvement in performance which can be obtained through revised compositions. You may have reviewed these test panels at the recent Paint Industries Show.

Your Williams representative will be glad to talk with you about house and barn paint formulations. Why not see him?

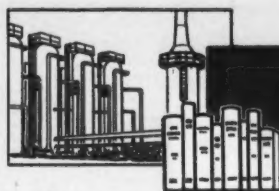
WILLIAMS

COLORS & PIGMENTS

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Easton, Pa.
East St. Louis, Ill. • Emeryville, Cal.

When inquiring check 5022
opposite last page

AUGUST 1957



processing and engineering data

HOW TO MAKE NOMOGRAPHS - I

A Modulus Chart

D. S. DAVIS

Professor of Engineering
University of Alabama

Ed. note — Starting with this issue, *CHEMICAL PROCESSING* will be running this series on "How to Make Nomographs" by Dr. Davis. This is the first of six installments.

Introduction

What are nomographs? Why are they made and used? Who makes them? Who uses them? Where and when are they used?

Nomographs are often called nomograms, alignment charts, and line coordinate charts. In their simplest forms they consist of three scales that can be cut by a straight line in values that satisfy an equation or agree with entries in a set of tables. So, they're ideal for making special calculations, particularly those industrial computations that are made over and over for control and operating purposes. Chemists, chemical engineers, and engineers in all fields make nomographs. Along with technicians and operating men, they like to use them, too, because nomographs save time and because they are simple, accurate, and leave one in no doubt about where to put decimal points.

The purpose of this series of papers is to provide sound graphical aids, practical working directions, and typical illustrations so that one can prepare elementary nomographs for his own needs. Those who desire a grasp of fundamental theory and need assistance in the design of more elaborate diagrams may wish to consult one of the recent texts² on the subject.

A Modulus Chart

We'll want to construct accurate natural and logarithmic scales, so we'll need some reliable guides. During our first venture into nomography as entered apprentices we can get along quite well with Fig. 1, p. 73, where all linear dimensions are reproduced to exactly 0.8 full size. In original of Fig. 1, natural or uniform scale at left is for true centimeters, with subdivisions of 2 mm. Although each cm of

original becomes 0.8 cm in reproduction, we shall continue, for convenience to refer to new units as centimeters throughout this series. To construct natural scales just cut out page 73 fold Figure 1 along lefthand axis, and use this scale to mark off other natural scales as needed.

The other scales in Figure 1 are logarithmic with scale factors or moduli (lengths of one cycle) of 4-1/6, 6 1/4, 8-1/3, 12 1/2, 25 and 50 cm. The scales with moduli of 8-1/3, 12 1/2, and 25 cm are almost exactly like the K, A, and D scales, respectively, on the usual 10-inch slide rule. Scales with moduli of 4-1/6, 6 1/4, and 12 1/2 cm are nearly identical with the respective K, A, and D scales on 5-inch slide rules. For convenience, the 50-cm logarithmic scale is divided into two parts. For this scale, graduations from 1 to 3.2 are at the right of the axis; those from 3.1 to 10 are at the left.

As we progress through our fellowcraft stage and wear out Figure 1, we may feel like investing a quarter or so in a more durable full-size (8 1/2 x 11-inch, bond paper) logarithmic modulus chart³, described previously¹, that includes a 100-cm logarithmic scale in four parts. When we feel that we would like to become master nomogramaniacs, we may want to put Keuffel and Esser statistician's scale (No. 1475 P) on our Christmas lists. Santa may then supply us with convenient and permanent means of directly laying off logarithmic scales of moduli of 4-1/6, 6 1/4, 8-1/3, 10, and 25 cm and indirectly constructing logarithmic scales of moduli of 2-1/12, 3 1/5, 5, 12 1/2, 16-2/3, 20 and 50 cm.

In October we'll deal with simple addition- and- subtraction charts. We'll need Figure 1 for several months, so be sure to cut it out and save it.

LITERATURE CITED

- (1) DAVIS, D. S., *Chem. Engr.*, 58 (3) 125 (1951).
- (2) DAVIS, D. S., "Nomography and Empirical Equations," New York, Reinhold Publishing Corporation, 1955.
- (3) DAVIS, D. S., "Logarithmic Modulus Chart," Bookstore, Virginia Polytechnic Institute, Blacksburg, Virginia.

☐ ☐ ★ ☐ ★ ☐

SUCCESS!

**"TWIN-SURE"
DOUBLE-SEAL**

GENERAL OFFICES AND PLANT: 22 WOODHULL STREET, BROOKLYN 31, NEW YORK

NEW SOLUTIONS

Starts on page 70

against resilient Hypalon, forming pressure-tight seal. Sediment or grit does not impede seating of disc. Flexible liner merely deforms and embeds any solids. When valve is reopened, liner returns to its original smooth surface and such material is flushed away.

Results: Chemical resistance and good physical properties of Hypalon have resulted in trouble-free, dependable valve performance.

After more than two years service, replacements have been unnecessary. It is a simple job to install new liner. Resilient sleeve snaps into ring-piece and acts as both valve seat and gasket between ring-piece and mounting flanges. Fleet operator has cut down on maintenance and operating expenses, and achieved peace of mind in handling of spent acids.

(Hypalon-lined valve is manufactured by Keystone Valve Corp., Dept. CP, 5325 Kirby Drive, Houston, Texas . . . or for more information check 5024 which is located opposite last page.)

(Hypalon is product of Elastomers Chemicals Dept., E. I. DuPont DeNemours & Co., Inc., Wilmington 98, Del. . . or for more information check 5025 which is located opposite last page.)

Wanted: Nomographs!

Each could earn \$20!

Do you have a pet nomograph that could save time for other CHEMICAL PROCESSING readers? Send it to:

DATA EDITOR
CHEMICAL PROCESSING
111 E. Delaware Place
Chicago 11, Illinois

CHEMICAL PROCESSING pays \$20 for each one accepted and published.

FOR "TOUGH" DEGREASING JOBS



formulate with EMCOL
H-50A, H-52, P10-59

Make tough emulsion degreasing jobs safer!
Make the removal of oil-soluble and water-soluble soils easier! How? By formulating emulsion degreasing compounds with these Emulsol "soapless" degreasing emulsifiers.

You get better performance because of:

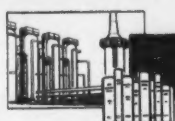
1. Lower emulsifier levels for reduced costs
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3. Greater spontaneity of emulsion with hot or cold water
4. Choice of "protective film" or oil-free surfaces
5. No sludging or scumming to clog degreasing systems
6. Minimized solvent toxic hazards

For more details, write for Bulletin No. 38, or check your local Emulsol technical representative.

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Serving Agriculture and Industry with dozens of EMCOL emulsifying agents.

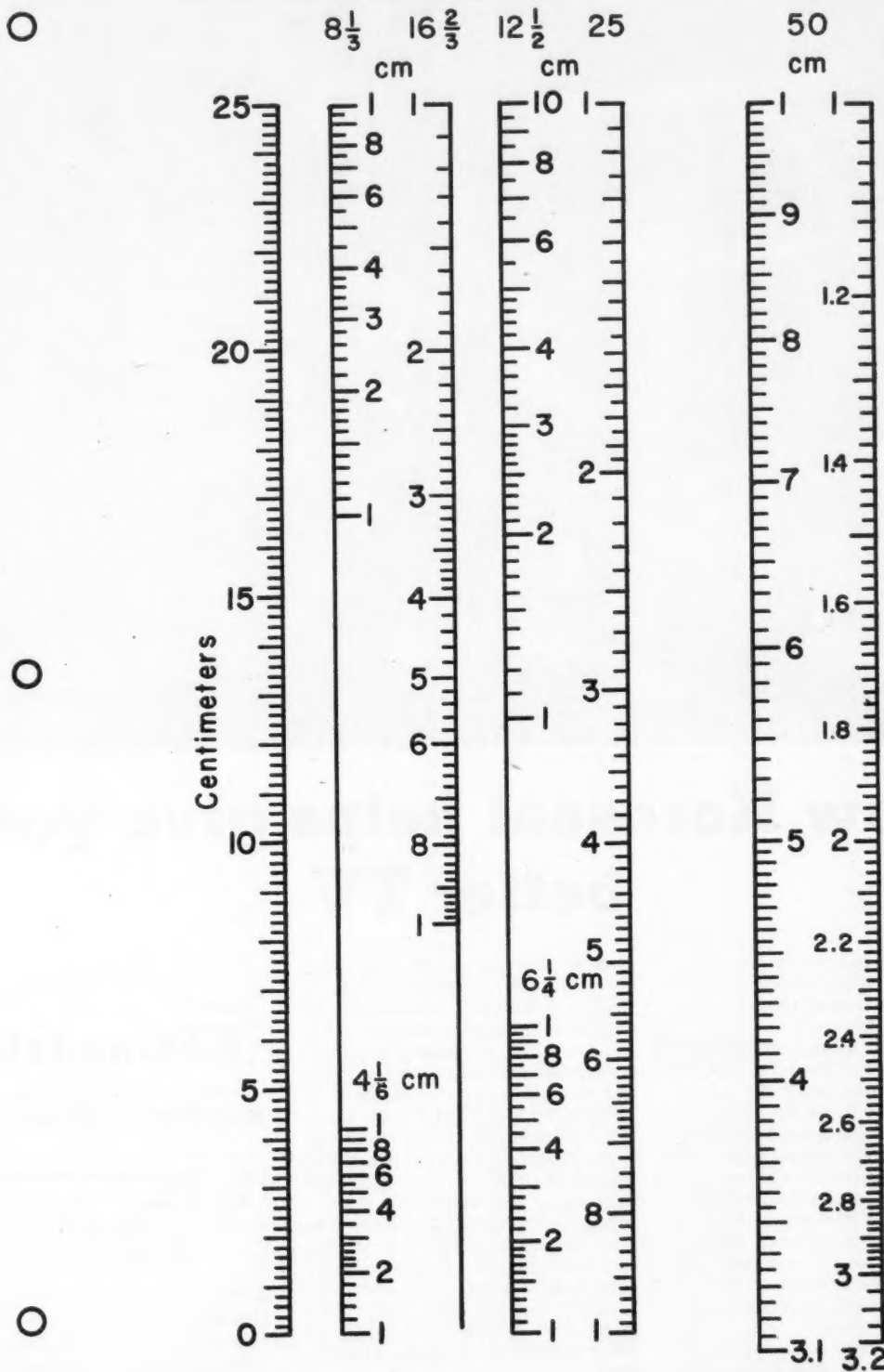
When inquiring check 5026
opposite last page



processing and engineering data

How to Make Nomographs - I

Starts on page 71



B.F. Goodrich



How Koroseal helps give you better TV

THAT piping you see carries deionized water. And because it's carried in Koroseal polyvinyl chloride pipe, the water *stays* deionized.

Rigid quality control at the Westinghouse Elmira, New York plant requires that water used in TV picture tube production must be deionized. Once the water is filtered and deionized, every care is taken to prevent recontamination—either chemical or electrolytic.

Engineers determined that many pipe materials would not remain inert in carrying the deionized water. Because Koroseal does remain inert and lasts indefinitely, it was selected to carry and protect the carefully processed water throughout the plant.

Inertness is only one property of Koroseal PVC pipe that makes it so

ideal for so many chemical and other industrial applications. Water, weather, sunlight, alcohol, salts, caustics, oils, and most acids have no deteriorative effects on Koroseal. It's simple to clean, imparts no odor or taste, requires no painting, and will not support combustion.

Light and easy to work with, Koroseal PVC comes in pipe, pipe fittings, rods, sheets—can be threaded or welded—is easily cut or drilled—has high impact and scuff resistance.

Koroseal's many unique qualities may contribute added efficiency and economy of operation in your plant. More complete information is yours for the asking. Simply send in the coupon on your right. *B.F. Goodrich Industrial Products Company, Marietta, Ohio.*



**B.F. Goodrich Industrial Products Co.
Dept. CP-8
Marietta, Ohio**

Please send me free booklets on:

- ☐ Rigid Koroseal Pipe
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Company

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City Zone State

Koroseal—T. M. Reg. U. S. Pat. Off.

NEW SOLUTIONS

**Liquid level controlled
without foam
at brewery**

**Stops loss due to variations
in filling containers**



Motor-transmission-pump combinations maintain $\pm 1/16$ " level in beer-filling machines

Problem: Costly losses were incurred on tax-paid contents of bottles and cans due to under- or over-filling at a large western brewery. Wide variation in liquid level in filling machine reservoir

Turn to page 76

WANTED: BUDDING CARTOONISTS!

CHEMICAL PROCESSING is in the market for cartoons. They should touch on some aspect of chemical plant or lab work.

Worth \$10 — Cartoons in black ink on 8 1/2 x 11" sheets — ready to reproduce — will bring \$10, paid on acceptance.

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U.S.I. CHEMICAL NEWS

★

A Series for Chemists and Executives of the Solvents and Chemical Consuming Industries

★

Shredded Polyethylene Protects Electronic Brains

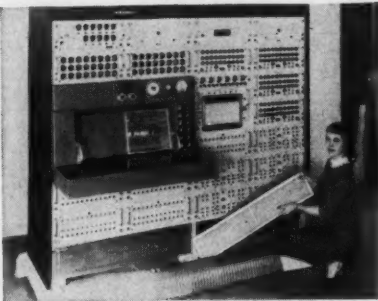
Special Form Supplied by U.S.I.

A self-charging electrostatic air cleaner, made of shredded polyethylene encased in a metal holder, protects the Goodyear Electronic Differential Analyzer (GEDA) from air-borne particles.

Shredded to present a large surface area to the air stream and to cause pronounced turbulence, the polyethylene generates an electrostatic charge which captures and holds dust, smoke and even pollen. Thus the air needed for ventilation in the electronic brain is free from the extraneous particles which might otherwise harm sensitive circuits.

These filters withstand air temperatures up to 212°F and are inert to chemicals normally encountered in industrial atmospheres. A special U.S.I. PETROTHENE® polyethylene resin is used, and is supplied in a form ready to be shredded instead of in the usual pellet form.

This particular polyethylene application is an example of how U.S.I.'s policy of tailormaking resins works in practice.



Secretary holds one of self-charging electrostatic air cleaners which protects analyzer.

Radiation Causes Decrease In Ability of Body to Absorb Methionine

New research indicates that the ability of experimental animals to make use of the essential sulfur amino acid, methionine, is impaired when the methionine is administered after exposure to radiation.

In the experiments, radiation from an X-ray source impaired the motor function of the digestive tract, causing delay in emptying the stomach and an increased rate of progression through the digestive tract. The progress of the methionine in the digestive tract of both the experimental and control animals was determined by tracer technique using methionine containing radioactive sulfur (S^{35}). Delayed absorption of methionine into the damaged tissues is thought to aggravate the digestive malfunctioning.

Previous research has shown that methionine given before exposure is effective in protecting against tissue damage caused by radiation. (U.S.I. CHEMICAL NEWS, Sept.-Oct., 1955.) These new findings indicate that methionine's action is largely protective rather than curative.

New Products, Packages Made 1956 Aerosol Industry's Biggest Year

Aerosol Hair Lacquers Become Sales Leader, CSMA Figures Show; New Glass and Plastic Aerosols Aided Industry's Growth

Results of the annual survey of the aerosol industry by the Chemical Specialties Manufacturers' Assn. show that 1956 was the biggest year yet for the 10-year-old industry. Unit sales were 320 million units, an increase of 33% over 1955, and 73% more than the 185 million units turned out in 1954.

U.S.I. Offers New Brochure On Zirconium and Hafnium

A new technical brochure which describes application and fabricating techniques for zirconium and hafnium has just been published by U.S.I.

In 12 pages, "Zirconium and Hafnium" provides technically minded readers with up-to-date information on properties, fabrication and uses in the nuclear and chemical processing industries. The brochure may be obtained by writing to U.S.I. at 99 Park Avenue, N. Y.

New Dibasic Acid Yields Water-White, Monomeric, Low-Temp Plasticizer

Hazen color tests on three monomeric, low-temperature vinyl plasticizers made with three different aliphatic dibasic acids and the same alcohol reveal that "U.S.I. ISOSEBACIC"® acid imparts by far the least color. A plasticizer made from synthetically produced ISOSEBACIC acid gave the low color reading of 150. Plasticizers made from the other dibasic acids, both derived from vegetable or animal oils, showed higher color. One gave a reading of 175 and the other was so dark as to be beyond the Hazen color scale.

"U.S.I. ISOSEBACIC" acid, a unique synthetic acid mixture of three C_{10} dibasic acids (2-ethyl suberic acid, 2,5-diethyl adipic acid and sebacic acid), not only permits production of esters of very light color, but also imparts to end products excellent low temperature flexibility and non-volatility characteristics expected of a material of this chain length. Isosebacate esters can be made at much lower cost than the corresponding normal sebacate esters.

"U.S.I. ISOSEBACIC" acid also shows promise as an intermediate for polyurethanes, nylon, polyesters, and high-temperature jet lubricants.

Sodium Dispersions Can Now Be Made Continuously

A new process for the continuous production of sodium dispersions has been developed and tested by the U.S.I. Research Department. For many processes, continuous preparation can provide higher production rates than conventional batch preparation.

Contributing to the upswing was the sharp sales rise of aerosol hair sprays. A relative newcomer to the field, hair sprays have even outdistanced insecticides in the race for top sales spot.

In the category of "Hair Lacquers", CSMA reported 1956 sales of nearly 80 million units. This figure is 25% of total sales for the industry.

Indications of the forward strides made by aerosols in the hair spray field had been apparent for some time; the Alcohol and Tobacco Tax Division of the Internal Revenue Dept. reported that last year 2,541,000 wine-gallons of alcohol went into hair and scalp preparations. This compares with 1,682,000 gallons for 1955, an increase of 51%.

While much of this alcohol went into hair and scalp preparations other than aerosol-packaged sprays and lacquers, it had been evident to industry observers that the aerosol market accounted for the bigger share of the gain.

New Packages Big Sales Factor

Influencing the upsurge in aerosol sales are such comparatively recent packaging innovations as the glass aerosol. Shampoos, perfumes, colognes, deodorants, suntan oil and other toilet preparations are now available in packages that combine the eye appeal of transparency with the convenience of the pushbutton dispenser.

In many cases, the desired safety factor is achieved by encasing the glass container in an attractive outer container molded of polyethylene. This plastic is also used almost exclusively for aerosol valves.

Thus, two U.S.I. products, ethyl alcohol and polyethylene, have played an important role in the phenomenal growth of the aerosol in-

MORE



A variety of container designs has helped build the aerosol industry to its present strength.

MORE

U.S.I. CHEMICAL NEWS

CONTINUED

Sodium Dispersions

The design—including suggested equipment and procedures—is available to processors who are experimenting with the use of sodium dispersions on a production basis.

Details are given in a new U.S.I. brochure, "Sodium Dispersions." Pertinent up-to-date information is included on all aspects of sodium dispersion technology. A copy is available on request. Detailed design information for a particular continuous sodium dispersion set-up can be developed by working with U.S.I.'s technical service engineers.

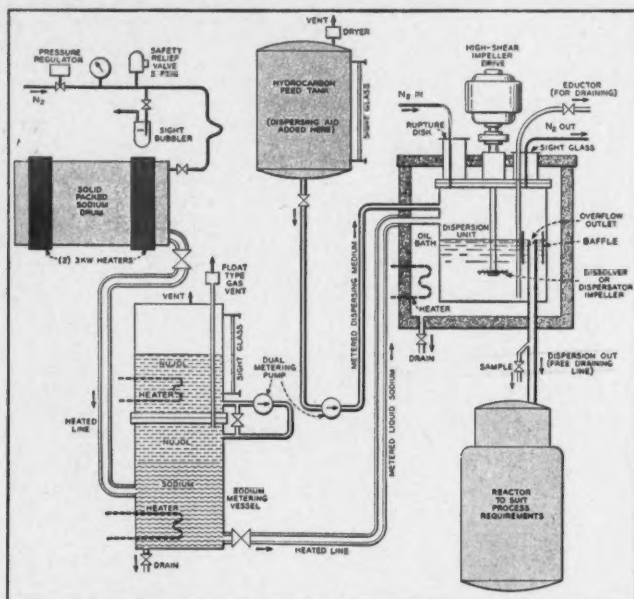


Diagram of the layout recently developed by the U.S.I. Research Department for continuous preparation of sodium dispersions... a new method in which sodium and an inert hydro-

CONTINUED

Aerosols

dust. Anhydrous ethyl alcohol is virtually a universal ingredient in hair aerosol formulations, and is widely used in other cosmetics now sold in aerosol form. Polyethylene, as already noted, is an important packaging component. U.S.I. provides nationwide distribution of these products, and technical assistance on their use.

Further Advances Seen

Aerosol industry leaders predict a continued rise in the sales curve. One of the largest makers of propellants forecast recently that unit sales of aerosols may well reach 600 million units by 1960.

TECHNICAL DEVELOPMENTS

Information about manufacturers of these items may be obtained by writing U. S. I.

A solvent synergist has been developed to upgrade general purpose cleaners. Said to be compatible with numerous solvents, to emulsify insolubles in water, and to be useable alone with water. Low in corrosive properties, volatiles, odor and cost. **No. 1250**

Flat non-curl photoprints now can be produced with a new chemical stabilizer, its manufacturer claims. Prints are said to show improved retouching properties, pliability and high gloss. **No. 1251**

Sodium amide dispersed in xylene now is available in 1, 2 and 5 lb. cans. Commercial production is reported planned, with concentrations of 50% solids or lower. Carriers such as xylene, benzene and toluene will be utilized. **No. 1252**

Polyethylene dropper bottles with close control of flow rate and drop size now are offered. Squeeze operated, they are said to be contamination proof and to eliminate need for bulb fitments. **No. 1253**

The chemistry of hydrocarbon petrochemicals and derivatives is the subject of a new book which can be purchased. Preparation, reaction, catalysts, equipment, new theory and developments are covered. **No. 1254**

A mold release for polyethylene, reported to be a relatively inactive parting agent, has been designed to cut down the stress crazing experienced in using some silicone releases. **No. 1255**

New precision splitters for sampling accuracy have been developed. For assay and microscopic work, they feature multiple chutes down to 1/8" wide, machined parts, elimination of traps. **No. 1256**

Beta Caryophyllene heads several sesquiterpene fractions now offered in commercial quantities by a major producer. Purity of fractions is said to range between 90% and crude. **No. 1257**

Automatic freeze-drying laboratory equipment, new type tray dryers, faster manifold-type freeze-dryers, and combination units are detailed in a brochure just published. **No. 1258**

Corrosion control in industrial and marine applications is the aim of a new system of primer and finish surface coatings based on polyamide reacted epoxy resins. Advantages claimed: adherence over wet surfaces, no under-film creep, toughness. **No. 1259**

carbon dispersing medium are continuously pumped into a preparation tank, agitated to the desired particle size, and the finished dispersion discharged at an equal rate.

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Amyl Alcohol, Refined: Fine chemicals, pharmaceuticals.
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Proprietary Denatured Alcohol Solvents: SOLOX®—General-purpose. FILMEX®—Special, authorized for certain industries. ANSOL® M—Anhydrous, special blend for lacquers, resins, etc. ANSOL® PR—Anhydrous, special blend with higher ester content and solvency for lacquers, resins, etc.

OTHER PRODUCTS

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Sodium Sulfate, Sulfuric Acid, Phosphoric Fertilizer Solution (Wet Process Phosphoric Acid) Ammonia, Nitrogen Fertilizer Solutions, Ammonium Nitrate, Zirconium Oxide, Zirconium Tetrachloride, Hafnium Oxide, Hafnium Tetrachloride.
Esters, Ethers and Ketones: Normal Butyl Acetate, Dibutyl Phthalate, Diethyl Carbonate, Diethyl Oxalate, Ethyl Acetate, Ethyl Ether, Acetone, Diethyl Oxalate.
Intermediates and Fine Chemicals: Acetoacetylides, Dimethyl Hydrazine, Ethyl Acetoacetate, Ethyl Benzoylacetate, Ethyl Chloroacetate, Ethylene, Ethyl Chloride, Ethyl Sodium Oxalacetate, U.S.I. ISOSEBACIC® Acid, Methyl Hydrazine, Sodium Ethylate Solution, Triethyl Aluminum, Trimethyl Aluminum, Urethan USP (Ethyl Carbamate).
Animal Feed Products: Calcium Pantothenate, Choline Chloride Products, Curbay 8-G® 80, Special Liquid Curbay®, DL-Methionine, Niacin USP, Riboflavin Concentrates, Vitamin B₁₂ and Antibiotic Feed Supplements, Vacatone® 40, Vitamin D₂, E and K₃ Products, Antioxidant (BHT) Products, U.S.I. Permadyr Products (Sealed-in Vitamin A), Special Mixes.
Pharmaceutical Products: DL-Methionine, N-Acetyl-DL-Methionine, Riboflavin USP, Urethan USP, Intermediates.
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- **EASILY INSTALLED** on new or old equipment. Just as easy to operate. Finger-tip adjustment gives right speed instantly.
- **MAINTENANCE IS NEGLIGIBLE**—complicated mechanisms to go out of order. All parts can be readily inspected. Belts can be quickly just or replaced.

Lovejoy Variable Speed Pulleys



are available in complete ranges of sizes from 1/2 inch to 12 inch ratios to 3 to 1. Shown is a Lovejoy variable speed unit controlling speed of a printing press.

Lovejoy Select-O-Speed Transmissions

can be supplied with hand wheel or lever control. Fractional to 5 hp., ratios to 10 to 1.

This Lovejoy Select-O-Speed is used to control the speed of a printing press.

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AUGUST 1957

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TRANSMISSIONS
You Money

WHY:

ECONOMICAL IN COST compared to variable speed transmission unit. Simple in design but in construction to give you dependable service.

INSTALLED on new or old unit. Just as easy to operate. Tip adjustment gives the speed instantly.

MAINTENANCE IS NEGLIGIBLE. No rotating mechanisms to get out of order. All parts can be readily replaced. Belts can be quickly added or replaced.

Variable Speed Pulleys

are available in a complete range of sizes from fractional to 15 hp., ratios to 3 to 1.

Shown is a typical Lovejoy counter-shaft unit controlling speed of automatic spring coiler.

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supplied and wheel control. Ratio to 5 hp., 10 to 1.

Lovejoy Speed is control the printing

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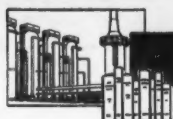
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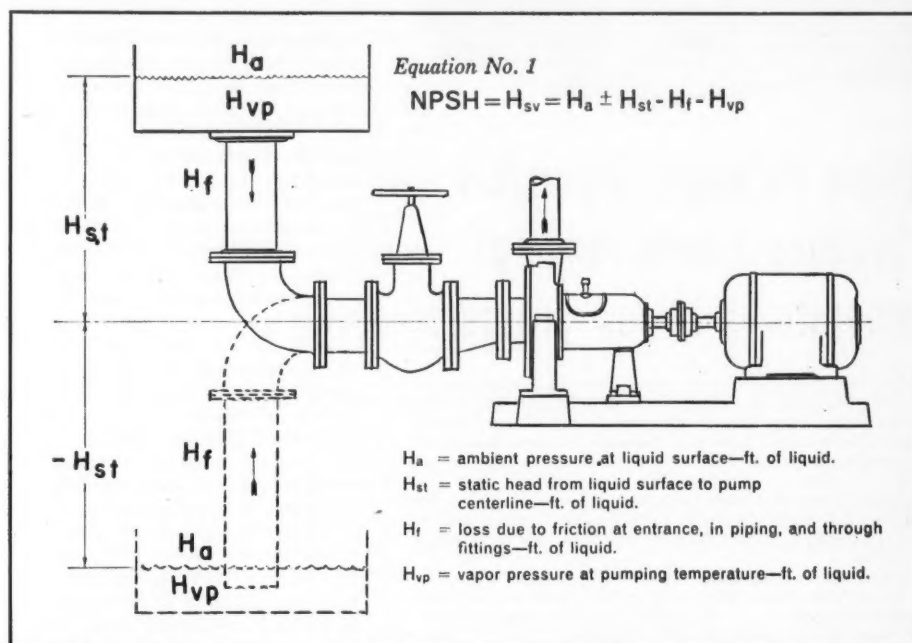
1957



processing and engineering data

Relationship between NPSH and suction speed for centrifugal pumps

A. J. HERRMANN, JR.,
Chief Engineer
Dean Brothers Pumps Inc.,
Indianapolis, Indiana



Most hydraulic problems arising in operation of centrifugal pumps occur in the suction side. Insufficient NPSH — net positive suction head above vapor pressure — is a major cause of such problems. Cavitation is the inevitable result of insufficient NPSH available in such systems relative to NPSH required by the pump. Use of Suction Specific Speed parameter enables the design engineer to anticipate and avoid cavitation troubles.

NPSH available in a system is defined as total suction head (ft of liquid) above liquid vapor pressure measured at the pump suction flange. It is calculated as shown in Equation 1 (in diagram above).

NPSH required, an individual characteristic of impeller design, is amount of pressure-drop (ft of liquid) which occurs between pump suction flange and impeller inlet tips. An NPSH curve is determined by adequate hydraulic testing.

To avoid cavitation, a process system must make available at least as much NPSH as is

required by the pump. If losses from suction nozzle flange to impeller blade inlet tips are greater than NPSH available, the liquid will flash into vapor. The vapor will displace an equal volume of liquid, reducing the capacity that the impeller can handle. This will be noticeable as a loss of total pumping head. When the vapor is in the form of small bubbles which collapse rapidly, noise and vibration may occur and damage is possible.

In laying out a process system, it is frequently desirable that the designer and estimator be able to anticipate pump NPSH requirements. Such information will preclude expensive revisions in tank height, piping, pump size, etc., and will provide a means to judge competitive pump quotations.

An "index" of the ability of a centrifugal pump to operate without cavitation is the magnitude of its suction specific speed. Pump designers use suction specific speed to determine NPSH requirements of an impeller design. This

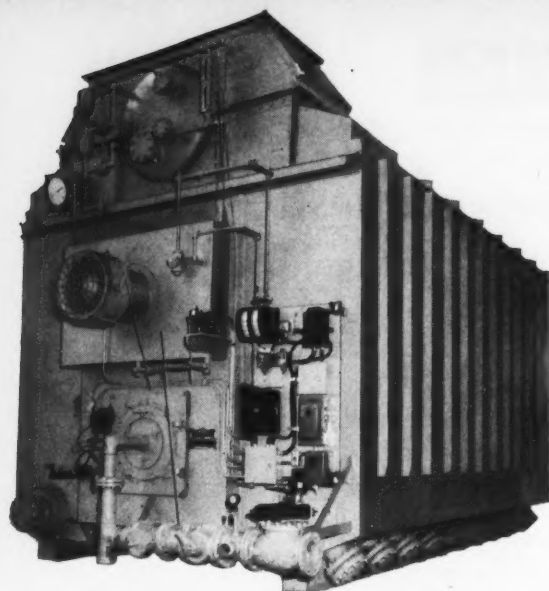
Turn to page 77

V2018

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57

XUM



Union Packaged Vaporizers produce a wide range of temperatures at low pressure

Furnished as a packaged unit completely assembled, piped and wired with controls mounted, this Union Type MH Dowtherm Vaporizer plays an important role in producing phthalic anhydride for a major coke and chemical concern. Equipped for gas firing, it has a capacity of 11,000,000 BTU/hr at 650° F.

Its compact, divided tube bank design assures uniform gas flow across the heating surface. With greater heating surface per BTU provided, correct fluid temperatures are maintained at all times.

Outfitted for heating with oil, gas, waste heat or special fuels, Union Vaporizers (both packaged and field erected) can be installed indoors or out to provide a wide range of accurately controlled temperatures at low pressure.

Union also produces a complete line of Process Heating Equipment for use with Dowtherm "A" and "E", Paracymene, Anisole, Aroclor #1248 and Heat Transfer Oil, either convection or forced circulation.

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NEW SOLUTIONS

Liquid Level

Starts on page 74

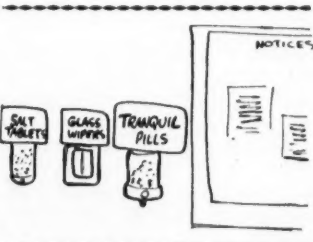
caused variation in fill level especially under starting and stopping conditions.

Reservoirs are small compared to flow demand upon them during full speed filling periods, hence level is very sensitive to inflow and outflow, and to levels in reservoir and storage tanks. Throttling of beer into reservoir caused considerable foam which resulted in additional level irregularity.

Solution: Brewery installed a pumping system consisting of an electric motor connected through a fluid-power variable-speed transmission to the positive-displacement pump handling the beer. Beer is pumped from storage tanks to filling machines on floor above. Liquid level in reservoirs is controlled by low air pressure signals. Pressure signals are transmitted to air and hydraulic servo controls on transmission to instantly vary drive output speed or direction of rotation.

Results: Precise control of beer pump rotation through variable-speed transmission increases, decreases, reverses, or stops flow of beer to accurately stabilize level and head to within $\pm 1/16''$ in reservoir even under most adverse operating conditions without foam. Uniform level assures accurate filling of each can or bottle. Several years of continuous service have proved drives to be dependable.

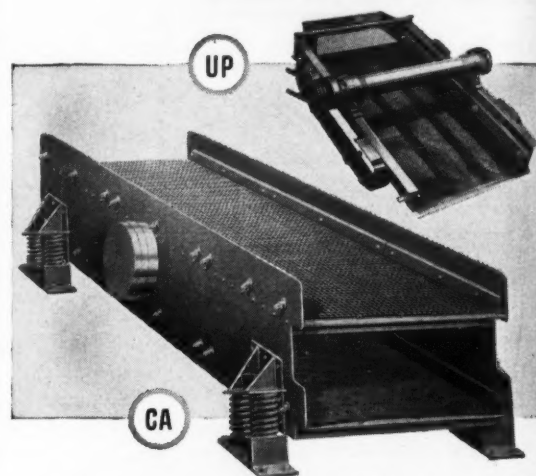
(Variable-speed fluid-drive transmissions are a product of The Oilgear Co., Dept. CP, 1586A W. Pierce St., Milwaukee 4, Wis. Check 5030 opposite last page.)



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✓ WET	✓ STICKY
✓ GRANULAR	✓ FLAKY

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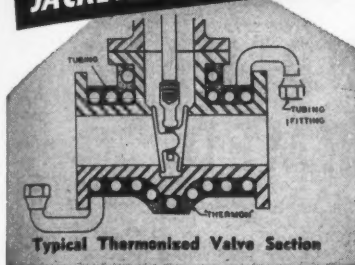
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**HEAT TRANSFER
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**SAVINGS UP TO 75%
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Definite Advantages of Thermonizing are:

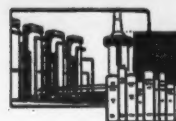
1. **LOW COST**—save up to 75% over equal jacketed equipment.
2. **EXCELLENT HEAT TRANSFER**—Exceeds steam traced equipment approximately 1100% and very closely approaches jacketed equipment.
3. **DEPENDABILITY**—no hot or cold spots.
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5. **NO JACKET PLUGGAGES OR PRODUCT CONTAMINATION**—in case of equipment failure, Thermon separates product from heating medium.
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opposite last page

AUGUST 1957



processing and engineering data

Relationship between NPSH and suction speed for centrifugal pumps

Starts on page 75

index is expressed in Equation 2:

$$S = N \sqrt{\frac{Q}{H_{sv}^{3/2}}}$$

where, S = suction specific speed

N = pump rotative speed, rpm

Q = pumping capacity, gpm

H_{sv} = NPSH above vapor pressure, ft of liquid at pump suction nozzle

A range of practical "S" values has proven of help to the process designer in anticipating those that are not commercially practicable. Values of "S" between 8500 and 12,000 represent well designed pumps. Values of "S" below 8500 are more available on the market. These ranges are, of course, general and will vary with such factors as pump size and impeller diameter. The values apply specifically to cold water and are conservative for other liquids. Accompanying charts represent graphical solutions for values of "S" pertaining to pumps rotating at 1750 and 3500 RPM.

Typical Example

Consider an application where a pump is needed to deliver 200 gpm. The pump is taking suction from a vessel with a liquid level of 9 ft above pump center line. Liquid in vessel is boiling. Entrance losses, pipe friction and fitting losses in suction pipe are equal to 2 ft of liquid.

From Equation 1:
NPSH = H_{sv} = H_a + H_{st}
— H_f — H_{vp}

Since liquid is boiling, H_a = H_{vp}

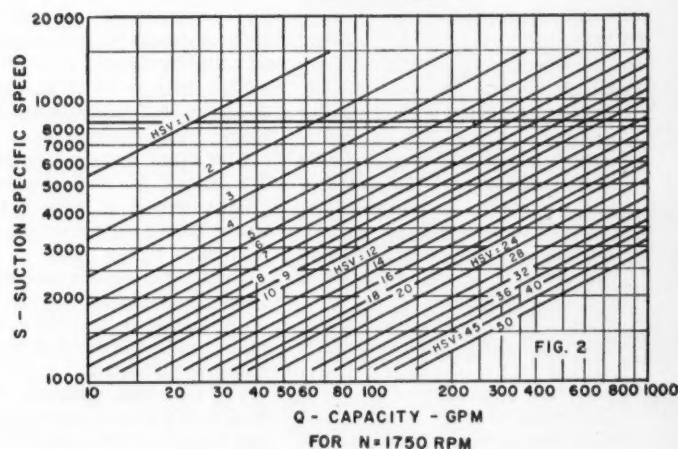
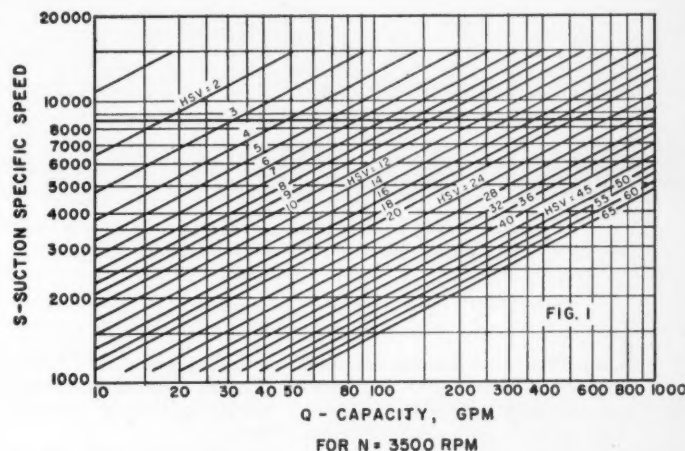
Therefore, H_{sv} = H_{st} — H_f = 9' — 2' = 7'

On Fig. 1, enter the chart at 200 gpm and move vertically to intersection of line H_{sv} = 7. Value of "S"

is 11,600. A 3500-rpm pump may be difficult to obtain for these conditions since "S" is near upper limit of practicability. If possible, more NPSH should be made available for a 3500-rpm selection.

Referring to Fig. 2, "S" value at 1750 rpm, 200 gpm is 5800. No trouble should be encountered meeting 7 ft NPSH at this speed.

(Curves for other 50- and 60-cycle speeds can be obtained from Mr. Herrmann at Dean Brothers Pumps, Inc., Dept. CP, 323 W. 10th St., Indianapolis 7, Ind. . . or check 5033 on form opposite last page.)

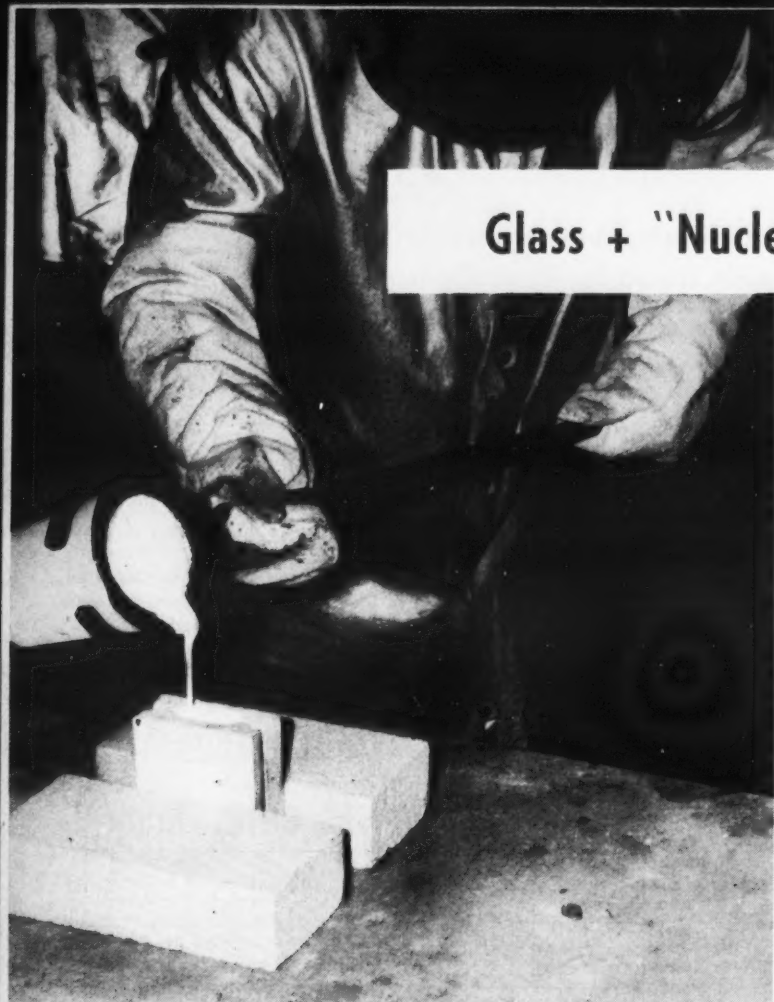




Glass + "Nucleating Agents" = Pyroceram

a corrosion-resistant construction material that is —

- ▶ LIGHT WEIGHT
- ▶ STRONG AND HARD
- ▶ EASILY FORMED



Pyroceram is easily adapted to mass-production techniques. It pours like glass — a high-heat treatment after forming develops its properties

GLASS is an amorphous solid possessing many useful properties. By adding certain "nucleating agents," glass can be made crystalline — and a large number of new uses opens up.

Although vague about saying just what these "nucleating agents" are that they add to their borosilicate glass (a glass similar to Pyrex-brand glass), a manufacturer has now made available an engineering material that's as light as glass — but stronger — and can be made harder than high-carbon steel. Electrical properties are similar to those of glass and ceramics.

Thermally, however, this crystalline glass (called "Pyroceram") has three times the heat transfer properties of glass.

It is more scratch-resistant and has a greater temperature gradient than glass. Pyroceram will withstand greater thermal shock

and has excellent chemical and erosion resistance. Gas permeability and water absorption are zero.

Chemical resistance tests of Pyroceram show that the Code 8608 material has a weight loss of 0.011 mg/sq cm after 24 hours in 5% HCl at 95°C (max). This is about 50% better than Pyrex-brand glass 7740.

The same material exposed to 5% NaOH for 6 hours at 95°C (max) shows a weight loss of about 1.5 mg/sq cm — about 25% less than Pyrex 7740.

Pyroceram can be molded, cast, spun, glass-blown, or even coated with metal. It is well-suited to mass production and should find many applications.

For example, company is now developing a heat exchanger from the material. Chemical pipe and pump development is scheduled for the near future. An all-Pyro-

TABLE	Pyroceram			
	8605	8606	8607	8608
Specific gravity (25°C)	2.62	2.60	2.40	2.50
Opacity	opaque	opaque	clear	opaque
Thermal				
Softening temp (°C)	1350	1250	—	—
Specific heat—mean (from 25°C — 400°C)	0.230	0.232	—	0.240
Thermal conductivity (CGS, 25°C mean temp)	0.0100	0.0073	—	0.0037
Linear coef. of thermal expansion x 10 ⁶ (25°C to 300°C)	14	57	-7	2 to 3
Mechanical				
Modulus of elasticity (psi x 10 ⁻⁶)	19.8	17.8	—	—
Modulus of rupture (psi x 10 ⁻⁵)	37	32	—	—
Strength/weight ratio M. R. strength/sp gr (psi x 10 ⁻³)	14.1	12.3	—	—
Hardness				
Knoop 50 gm	1100	940	—	—
Abrasion (sand blast)—plate glass = 1.0	27	20	—	—
Electrical				
Dielectric constant (10 ⁶ cps @ 300°C)	6.3	5.80	—	—
Dissipation factor (10 ⁶ cps @ 300°C)	0.014	0.013	—	—
Loss factor (10 ⁶ cps @ 300°C)	0.0782	0.07540	—	—
Volume resistivity (log ohm-cm @ 250°C)	10.1	10	—	—

ceram valve may be available at present — each with a special combination of processing characteristics and final properties.

After melting at temperatures about 1000°C, the material is formed, then subjected to a high-heat treatment which brings about the crystallization and the improvement in properties.

Cost of the materials is relatively low — somewhat higher than that of glass, but lower than steel.

(Pyrocerams are products of Corning Glass Works, Dept. CP, Corning, N.Y. . . . or for more information check 5034 on form opposite last page.)

CARBIDE'S Morpholine means

Advantages, applications of one-shot prepolymer isocyanate foams

Automatic fabrication units will spur uses

Isocyanate foams can vary from semi-rigid to completely rigid structures, depending upon chain length between branch points.

A true fluid prepolymer uses water to form the foam structure as well as gas, and has low amount of branching in the original resin (therefore long chain length) in order to keep viscosity and final rigidity low. The one-shot system has short chain lengths and more rigidity because it is formed on the spot and high viscosity is no problem.

The two systems differ in a number of ways, which affect their application:

Cell structure — The one-shot system has closed cells, permits higher retained buoyancy values and lower water absorption than prepolymers.

Heat distortion — Prepolymers can be used as high as 150°F under load, 220°F without load. The one-shot systems can be used as high as 350° to 400°F.

Strength — Compression, tension, shear, and bending moments are best met with one-shot systems. For impact strength, use prepolymers.

Cost — Prepolymers cost about 25c less per pound.

Cure — Prepolymers post-cure at room temp. Many one-shots require additional oven or lamp heating.

General — One shot systems have slightly better insulation and electrical properties and less shrinkage tendency. Prepolymers adhere better to various surfaces.

Applications

Structural uses — Largest potential use for rigid isocyanate foams is in panels. These can be made by forming in the horizontal position and then pouring in place, or by using a vertical holding fixture, then introducing the resin material which foams and hardens in place.

Insulation — Polyurethane has a definite place both



unsurpassed performance for rubless polishes

If you are making rubless polishes—whether they be tailored for the home, factory, or office—then you need Morpholine. Reasons why? Morpholine based rubless polishes dry quickly—fast enough in fact to allow traffic on the floor shortly after application.

When it comes to water resistance, rubless polishes based on this amine—by performance and rigid test—are unsurpassed. Our Technical Representative can show you data proving the value of Morpholine in giving fast dry and excellent water resistance to these polishes.

In addition to Morpholine, other chemicals from Union Carbide Chemicals Company, such as triethanolamine, dimethyl ethanolamine, and TERGITOL nonionic NPX are valuable in making various rubless polishes. Suggested formulations for these polishes are contained in the 92-page "Emulsions and Detergents" Booklet. This booklet also contains technical data and suggested formulations for "soluble" oils, solvent emulsions, wax emulsions, oil and wax polishes and detergents. You'll want a copy—it has helped others improve their products or find new avenues for profit.

In Canada, Carbide Chemicals Company, Division of Union Carbide Canada Limited, Montreal.

UNION CARBIDE CHEMICALS COMPANY

Room 328, 30 East 42nd Street, New York 17, New York

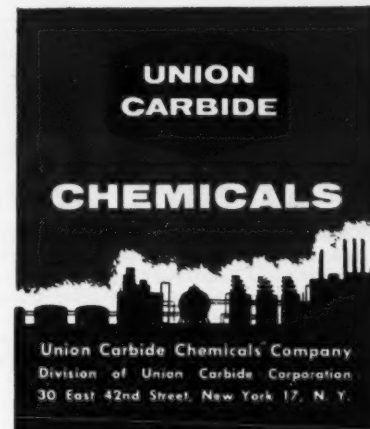
Please send me a copy of "Emulsions and Detergents."

Name.....

Company.....

Street.....

City..... State.....



"Tergitol" and "Union Carbide" are registered trade-marks of Union Carbide Corporation.

When inquiring check 5035 opposite last page

"NOSEY" says:

WHAT'S the use tryin' to market a product most people won't buy? If what you're offering has an unpleasant odor, that's just about what you're attempting. First thing you oughta do if that product of yours doesn't smell too good, is take it to some reliable odor specialist like FRITZSCHE, and put it right up to them to give it a real nice odor—one that'll make folks hanker to buy if for no other reason than that it makes a pleasant impression. That'll help, not hinder your product's sales!

FRITZSCHE
Brothers, Inc.

PORT AUTHORITY BUILDING, 76 NINTH AVENUE, NEW YORK 11, N. Y.

BRANCH OFFICES and STOCKS: Atlanta, Ga., Boston, Mass., Chicago, Ill., Cincinnati, O., Los Angeles, Calif., Philadelphia, Pa., San Francisco, Calif., St. Louis, Mo., Montreal and Toronto, Canada and Mexico, D. F. FACTORY: Clifton, N. J.

When inquiring check 5036 opposite last page



**EXTRA LIFE FOR
OLD ROOFS
with TROPICAL
Cold-Process Roofkoter**

AT 50% SAVINGS

Thousands of industrial and commercial building roofs have been given added years of weather-tight service—the Tropical Roofkoter way. Following our simple step-by-step instructions, your own unskilled labor force does a first-class reconditioning job—saves you up to half the cost of roof repair. Long-lasting "live" Roofkoter flexes with temperature changes, will not crack, blister, dry-out or powder.

FREE! Our free booklet "Saving Old Roofs" can save you money on roof repair. Write today!

TROPICAL PAINT COMPANY
1128-1262 W. 70th, Cleveland 2, Ohio

HEAVY-DUTY MAINTENANCE PAINTS SINCE 1883 • SUBSIDIARY OF PARKER ROOF PROOF COMPANY

When inquiring check 5037 opposite last page

MATERIALS

property-wise and cost-wise. The only stumbling block at present is a truly automatic machine to dispense it.

Buoyancy — Foams are used alone or in laminates. Use of the prepolymer system (with its partially open cells) is usually excluded, unless the part is completely moisture-sealed.

Shock vibration and damping — Prepolymer foams are ideal for this. A big use is in packaging delicate and temperature-sensitive materials.

Electrical — A big use is in making radomes on nose of fighter aircraft. In electrical encapsulation, foams give excellent quality, greater economies in assembly time than existing casting resins.

Automatic Machinery

Automatic foaming machinery will open many doors to urethanes. Once it is readily available, the volume of urethane sales will grow by leaps and bounds.

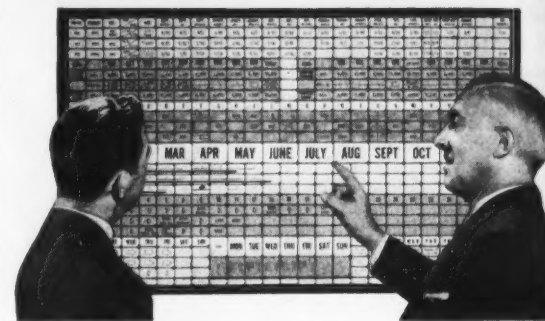
(Highlights of a paper by Benjamin S. Collins, Chief Development Engineer, Nopco Chemical Company, Harrison, New Jersey. Presented at the 13th Technical Conference of the Society of Plastics Engineers. For more information on isocyanate foams check 5038 on Readers Service slip which is located opposite last page.)

**Makes anhydrous NaOH
that is free-flowing
and won't cake**

Of interest to those using caustic in automatic machinery for packaging or processing is a free-flowing, non-caking grade of anhydrous sodium hydroxide. Flo-chilled Caustic is made by process which eliminates the factors that cause caking. Product is dustless, of uniform particle

(Free-flowing caustic is a product of Michigan Alkali Div., Wyandotte Chemicals Corp., Dept. CP, Wyandotte, Mich. . . or for more information check 5039 on form opposite last page.)

How To Get Things Done



BOARDMASTER VISUAL CONTROL

Gives you a Graphic Picture of your operations, spotlighted in color. You See what is happening at a glance. Facts at eye level — saves you time, prevents errors.

Simple, flexible — easily adapted to your needs. Easy to operate. Type or write on interchangeable cards, snap in grooves. Ideal for production, scheduling, sales, traffic, inventory, etc. Made of metal. Compact, attractive.

Complete Price **\$49⁵⁰** Including Cards

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Mailed Without Obligation

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NEW YORK 36, N. Y.

When inquiring check 5040 opposite last page

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*from contemporary
publications*

READ THEM . . . IN THIS ISSUE

You get a "quick look" at the most valuable articles being published in this field, and kindred fields . . . by reading the "BRIEFS" section of CHEMICAL PROCESSING every month.

Our Editors read more than 50 contemporary publications every month . . . select those articles they believe you will want to know about . . . and, in terse style, they tell you about them. Name of publication and issue are given so you can read those you want to know more about.

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CHEMICAL PROCESSING

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acts at eye

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nd STREET
36, N. Y.

page

MATERIALS

**Makes pharmaceuticals,
rubber accelerators,
insecticides**

95+ % pyrrolidine avail-
able on developmental scale

Uses: Potential intermediate
for rubber accelerators, in-
secticides, pharmaceuticals.

Features: Pyrrolidine un-
dergoes typical secondary
amine reactions.

Description: Purity is
95+%. BP (760 mm) is 86-
87°C. The moderately toxic
and flammable liquid is avail-
able on developmental scale.
Price in drums is \$3.50 per lb.

(Pyrrolidine is a product of
Chemical Products Dept., An-
sul Chemical Co., Dept. CP,
1 Stanton St., Marinette, Wis.
... or for more information
check 5041 on the convenient
Reader Service slip which is
located opposite last page.)

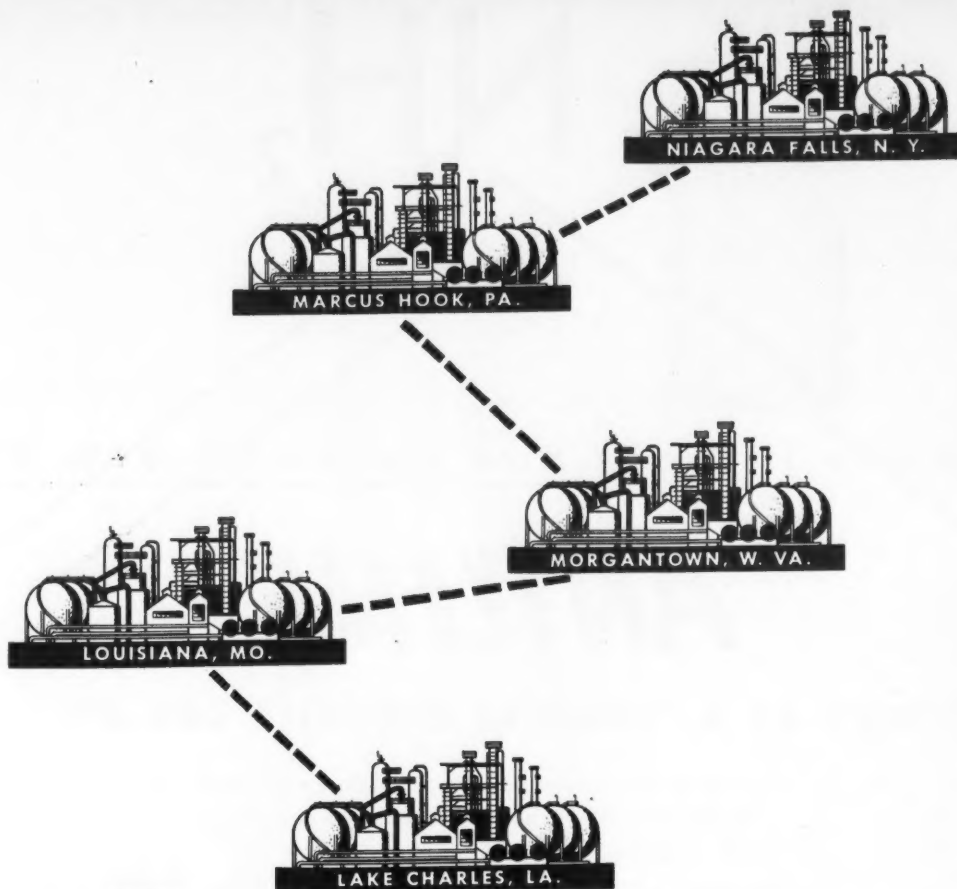
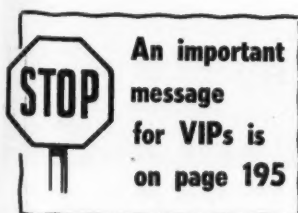
**Low-temp flexibility
given to vinyls
at low cost**

Uses: As plasticizer for vin-
yls.

Features: Material imparts
low-temp flexibility in vinyls
at low cost.

Description: Phthalate plas-
ticizer combines low-temp
flexibility and low volatility
with good processing charac-
teristics. Good initial viscos-
ity, prolonged shelf life make
product suitable for plastisols.

(PX-313 is product of Indus-
trial Chemicals Div., Pitts-
burgh Coke & Chemical Co.,
Dept. CP, Grant Bldg., Pitts-
burgh 19, Pa. ... or for more
information check 5042 on
form which is located oppo-
site last page.)



5 - plant safety backs up every order for Mathieson AMMONIA

Sustaining your production at its most profitable levels is an Olin Mathieson specialty. The minute you "get on the Mathieson pipeline," your operation is backed up by five full-time shipping points—strategically spotted from Canada to the Gulf.

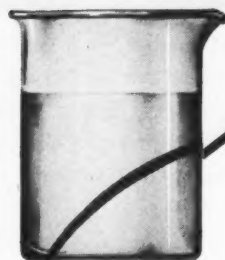
Whether you want practical technical assistance ... or whether you want first-hand information about the Mathieson ammonia "extras" of purity and supply ... you'll find that half an hour with your Mathieson representative may lead to years of more profitable processing.

MATHIESON CHEMICALS
OLIN MATHIESON CHEMICAL CORPORATION
INDUSTRIAL CHEMICALS DIVISION • BALTIMORE 3, MD.

4976

INORGANICS: Ammonia • Bicarbonate of Soda • Carbon Dioxide • Caustic Potash • Caustic Soda • Chlorine • Hydrazine and Derivatives • Hypochlorite Products • Muriatic Acid • Nitrate of Soda • Nitric Acid • Soda Ash • Sodium Chlorite Products • Sulfate of Alumina • Sulfur (Processed) • Sulfuric Acid
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When inquiring check 5043 opposite last page



We make it Clear and Pure - 99.94% Pure

ANILINE

PURE AS A "TONNAGE ORGANIC" CAN BE!

Car after car, day in and day out, our modern new plant at Moundsville, W. Va. meets and beats our own tough "specs" on aniline.

The "specs" call for 99.9% but we regularly ship cars that analyze as high as 99.95%. Literally, our aniline is as pure as a "tonnage-organic" can consistently be!

With recently-doubled capacity and a strategic location on the Ohio River just south of Wheeling, W. Va., we make fast deliveries by rail, truck or inland waterway.

If you are not already using our water-white, uniform, exceptionally-pure aniline, we will be pleased to furnish samples, specification and price quotation.

NATIONAL ANILINE DIVISION

ALLIED CHEMICAL & DYE CORPORATION
40 RECTOR STREET, NEW YORK 6, N. Y.
Akron Atlanta Boston Charlotte Chattanooga Chicago
Columbus, Ga. Greensboro Los Angeles New Orleans Philadelphia
Portland, Ore. Providence Richmond San Francisco Toronto



When inquiring check 5044 opposite last page

MATERIALS

Pesticide compound has long-lasting effectiveness

Uses: In making agricultural dusts or sprays.

Features: Has long-lasting effectiveness in controlling many crop pests. Kills both mites and their eggs.

Description: Dithiophosphate of dioxane won't damage treated plants when used according to recommendations. Usual precautions in handling phosphate-type insecticides should be followed.

(Pesticide 528 is a product of Hercules Powder Co., Dept. CP, Wilmington 99, Del. . . or for more information check 5045 on form which is located opposite last page.)

Polyamide-phenolic finishes are tough, thermosetting

Have good shelf life and are easy to handle

Uses: Polyamide-phenolic baking finishes can be used on cans and drums, pipes and tanks, industrial articles and wire. They can be formulated into insulating varnishes and chemically-resistant finishes. Use in laminates and adhesives is being studied.

Features: These coatings are thermosetting and have good pot life. When cured, the finishes combine the hardness



Coating is resilient, flexible. Hammering doesn't phase it.

and solven
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Thanks to
Chemical

MATERIALS

and solvent resistance of the phenolics with the flexibility, adhesion, and alkali resistance of the polyamides. They are very resistant to most common strong solvents and chemicals.

Description: Liquid polyamide resins with unreacted amino groups (such as Versamids 100, 115, and 125) can react with certain other resins for forming thermosetting alloys.

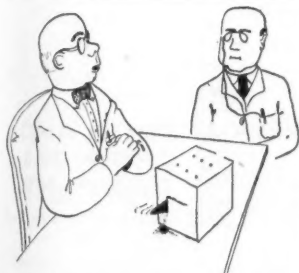
With heat-reactive phenolic resins, the amino groups of the polyamide combine with the methylol groups of the phenolic. A carbon-nitrogen bond is formed and water is released. At the recommended cure temperatures of 400°F (for 15') or 300°F (for 30 to 60'), the water is quickly dissipated as steam from films of normal thickness.

Typical formula for clear, baking finish at 49% NV is:

	Lb	Gal
Polyamide resin (Versamid 115)	200	24.3
Butanol (or Cellosolve)	44	6.5
Xylene	393	54.8
Phenolic resin (such as Bakelite's CLS-3112, 55% NV)	363	42.5
	1000	128.1

For a cutting solvent, use a 1:1 xylene/butanol blend.

(Liquid Versamids are products of Chemical Div., General Mills, Inc., Dept. CP, Kankakee, Illinois . . . or for more information check 5046 on form opposite last page.)



"I hope for your sake, this isn't another of your schemes for shrinking beads."

Thanks to Martha Sheahan, Lindsay Chemical Co., West Chicago, Ill.

Times have changed!

HAVE YOU LOOKED AT GLYCERINE LATELY?

Glycerine

Today, you can specify glycerine with confidence . . . benefit from its many useful physical and chemical properties.

Shell glycerine meets industry's highest standards for purity, and is unsurpassed in uniformity.

Whether you order in drums or tank cars, Shell's conveniently located storage facilities assure prompt and dependable delivery. Call your Shell representative for specifications.

SHELL CHEMICAL CORPORATION

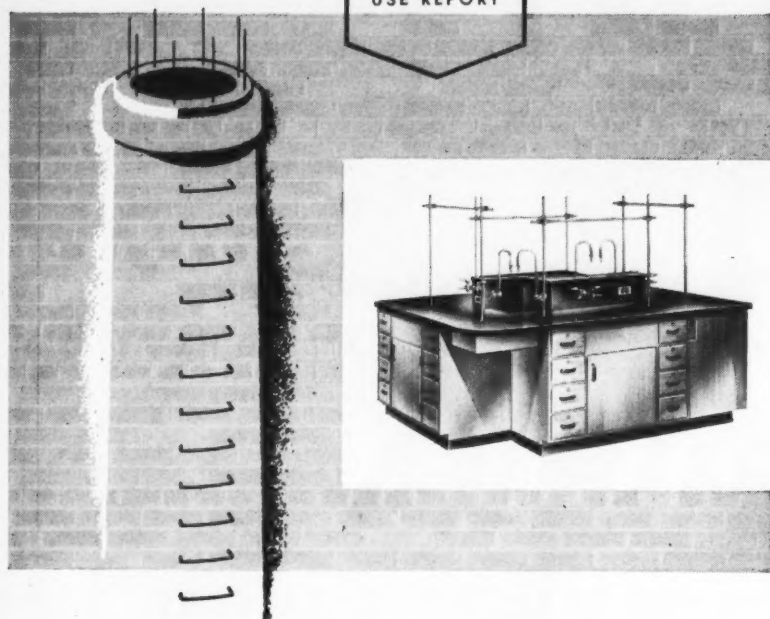
CHEMICAL SALES DIVISION, 380 Madison Avenue, New York 17, New York

Atlanta • Boston • Chicago • Cleveland • Detroit • Houston • Los Angeles • Newark • New York • San Francisco • St. Louis
IN CANADA: Chemical Division, Shell Oil Company of Canada, Limited • Montreal • Toronto • Vancouver



When inquiring check 5047 opposite last page

A
QUAKER OATS
COMPANY
CHEMICAL
USE REPORT



from Smokestacks to Table Tops...
Where Chemical Resistance Counts

Industry turns to **FA**[®]

Resins made with QO furfuryl alcohol afford excellent resistance to acids, alkalis and solvents. FA resins are used in mortars for the construction of floors, pickling tanks, sewers, digesters, reactors and smokestacks. These resins also serve as binders in glass fabric or asbestos reinforced pipe, duct, and tanks. In addition, chemically resistant laboratory table tops are produced by impregnating porous stone with a furfuryl alcohol resin.

This is but one area of industrial usefulness for QO furfuryl alcohol. For complete physical data, chemistry, other uses, and general information, write for your copy of Furfuryl Alcohol Bulletin 205.

The Quaker Oats Company does not manufacture furfuryl alcohol resins, but is glad to put you in touch with suppliers.

BULLETIN 205

The Quaker Oats Company CHEMICALS DEPARTMENT

336R The Merchandise Mart, Chicago 54, Illinois
Room 536R, 120 Wall Street, New York 5, New York
Room 436R, 48 S.E. Hawthorne Blvd., Portland 14, Oregon

In the United Kingdom: Imperial Chemical Industries, Ltd.,
Billingham, England

In Europe: Quaker Oats-Graanproducten N. V., Rotterdam,
The Netherlands; Quaker Oats (France) S. A., 3, Rue Pillet-Will,
Paris IX, France; A/S "Ota," Copenhagen, S. Denmark

In Australia: Swift & Company, Ltd., Sydney

In Japan: F. Kanematsu & Company, Ltd., Tokyo



When inquiring check 5048 opposite last page

MATERIALS

**Impact, flexural strength
are excellent qualities
of polyester resin**

Laminates resist impact
cracking, are strong, stiff

Uses: For applications with
glass fiber; as molding resin,
especially in matched dies.

Features: Material possesses
good impact and flexural
strengths. Laminates are
strong, stiff, resist impact
cracking, and are self-extin-
guishing.

Description: Polyester resin
is medium viscosity, semi-
rigid type. Price of \$0.39 per
lb delivered (in truckloads) is
about 13% less than similar
material produced by compa-
ny. Typical properties are:

Viscosity (G-H)	X-Y
Color (Gardner, max)	3
Sp gr (73°F)	1.27
Uncatalyzed stability	
@ 73°F (months)	6+
@ 158°F (days)	7
Gel time (SPI, minutes)	5-6
Cure shrinkage (vol %)	6.2
Heat distortion point (°F)	183

(Hetron® 33 is product of
Durez Plastics Div., Hooker
Electrochemical Co., Dept. CP,
North Tonawanda, N.Y. . . . or
for more information check
5049 on form which is located
opposite last page.)

**Emulsions of oleic acid
diluted to any degree
without breaking**

Uses: For preparation of
emulsions of red oil and of
oleic acid-mineral oil mix-
tures, as used for oiling of
wool for spinning.

Features: Emulsions may be
diluted to any desired degree
without breaking.

Description: Nonionic sur-
face-active agent produces
clear solutions which are sta-
ble to acids, alkali, salts, and
hard water.

(Lubrol WX surface-active
agent is available from Ar-
nold, Hoffman & Co., Inc.,
Dept. CP, 55 Canal St., Provi-
dence 1, R.I. . . . or for more
information check 5050 on
form which is located oppo-
site last page.)

*Excerpts
From The
Chemical
Hall of
FAME*



Victor Grignard
(1871-1935)

Received the Nobel prize in 1912 for his
development of the *Grignard reaction*
which was of considerable importance
in synthetic organic chemistry.

By 1912 Foremost's El Dorado Division
already had more than 20 years' expe-
rience supplying coconut oil and its by-
products of the finest purity and con-
sistent uniformity.

F A M E
FATTY ACIDS METHYL ESTERS
OF COCONUT OIL

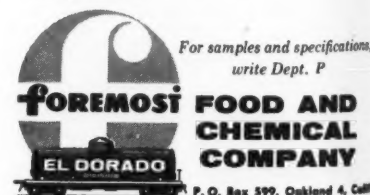
Fatty Acids { Lauric Eldhyco* Capric
 Capyrylic Coconut
 Palmitic Myristic

Methyl Esters { Caprylate Eldo 18* Caprate
 Laurate Coconate
 Myristate Caproate Palmitate

*T.M. Reg.

For Example: **ELDO LAURIC ACID**

96-99% pure. (Purest Lauric Acid com-
mercially produced.) Readily available
at an attractive price. Eldo's high stand-
ards give you a better, more uniform
end product.



For samples and specifications,
write Dept. P

P. O. Box 599, Oakland 4, Calif.

In New York: H. Reisman Corp. In Detroit: Harry Holland & Son, Inc.
In Chicago: M. B. Sweet Co. In Cincinnati: Howard Dock In Cleveland: F. W. Kamin Co.

When inquiring check 5051
opposite last page

CHEMICAL PROCESSING

Waxes
without
of fatty

Uses: A
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AUC

MATERIALS

Waxes easily emulsified without addition of fatty acids

Uses: As emulsifiable waxes.

Features: Because of formation of high-mw acid and esters during processing, waxes can be emulsified easily without further addition of fatty acids as part of system.

Waxes have very pale yellow color in spite of their high acid values and degree of oxidation. They can carry inert hydrocarbons, silicones, pigments, solvents, and other difficult-to-emulsify materials into aqueous systems.

Description: Emulsifiable waxes are derived by oxidation of high-mw hydrocarbon polymers, and have acid values of 40 and 60. These values are result of formation of high-mw polymeric acids and esters during manufacture.

(Aerok E-24 and E-600 waxes are products of Aerogon Chemical Industries, Dept. CP, 240 Broadway, New York 7, N.Y. . . . or check 5052 on form opposite last page.)

Here's another starter in fast-growing field of gibberellic acids

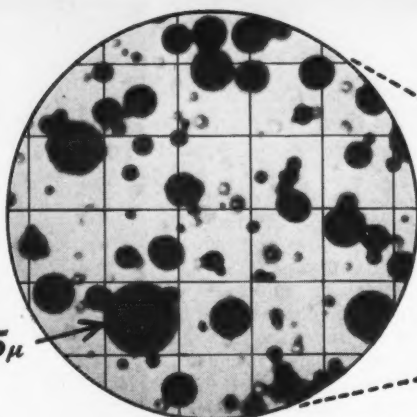
Company announces availability of gibberellic acids in crystalline form, ready for commercial formulation.

Gibberellic acids not only stimulate plant growth, they also cause earlier flowering, faster germination, more rapid seed maturation, and release from dormancy.

(Gibberellic acids are available from Chemical Sales Div., Abbott Laboratories, Dept. CP, North Chicago, Ill. Check 5053 opp. last page.)

625 New Chemicals

Over 625 chemical compounds and products introduced by 136 chemical manufacturers during 1956 are indexed and described in 16-page reprint from the April issue of CHEMICAL PROCESSING. It is available at \$1 a copy from The Editors, CHEMICAL PROCESSING, 111 E. Delaware Pl., Chicago 11, Illinois.



Here's the latest on Lithium METAL DISPERSIONS

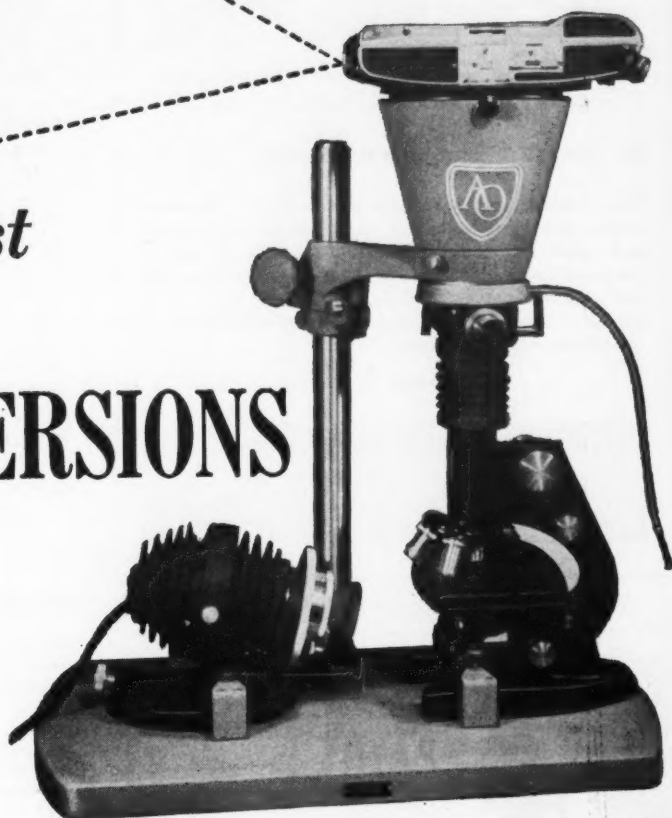
Got a catalyst problem?

Interest sparked by the discovery that lithium metal dispersions make unique polymerization catalysts (the polymerization of isoprene to a "natural" rubber) indicates a heretofore unexploited instrument of research.

Consequently, Lithium Corporation is now making available experimental quantities of dispersions of this highly reactive metal. These dispersions may be purchased in either mineral oil or a mineral oil-petrolatum combination as the dispersing medium. Dispersions in other media are available as special items. The "package" is obtainable in five sizes from 25 grams to 1 pound. Over 90%

of the lithium metal particles have a diameter less than 25 microns.

Specifications, information for preparing the dispersions including handling instructions, prices and product data on lithium metal may be obtained by submitting a request on company or institutional stationery.



Microscope and Illuminator by American Optical Company, Instrument Division, Buffalo, New York. Polaroid® Land Camera by Polaroid Corporation, Cambridge, Massachusetts.

... trends ahead in industrial applications for lithium



PROCESSORS OF LITHIUM METAL • METAL DISPERSIONS
METAL DERIVATIVES: Amide • Hydride
SALTS: Bromide • Carbonate • Chloride • Hydroxide • Nitrate
SPECIAL COMPOUNDS: Aluminate • Borate • Borosilicate • Cobaltite • Manganite
Molybdate • Silicate • Titanate • Zirconate • Zirconium Silicate

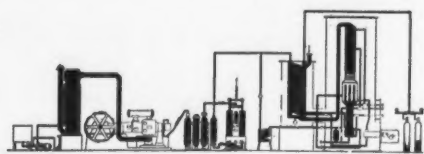


LITHIUM CORPORATION
OF AMERICA, INC.
2535 RAND TOWER, MINNEAPOLIS 2, MINN.

BRANCH SALES OFFICES: New York • Chicago • Bessemer City, N. C.
MINES: Keystone, Custer, Hill City, South Dakota • Bessemer City, N. C.
Cat Lake, Manitoba • Amos Area, Quebec
PLANTS: St. Louis Park, Minnesota • Bessemer City, N. C.
RESEARCH LABORATORY: St. Louis Park, Minnesota

When inquiring check 5054 opposite last page

Make Oxygen



SUPAIRCO plants produce gaseous or liquid oxygen, gaseous or liquid nitrogen, acetylene, liquid air

Do you have our latest catalog?

New catalog describes single and double rectification plants and lists production data, shows flow charts and plant layouts. Single rectification type plants range in size from 300 to 800 cu. ft. per hour capacity, and double rectification type from 900 to 12,000 cu. ft. per hour. Large liquid oxygen plants are available in capacities to 25 tons a day.

Free catalog on request

SUPERIOR AIR PRODUCTS CO.

132 MALVERN STREET • NEWARK 5, NEW JERSEY • U. S. A.
Manufacturers of production and storage equipment for gaseous or liquid oxygen, nitrogen, air, hydrogen and helium

When inquiring check 5055 opposite last page.)

PREFERRED FOR

PAINT PRODUCTS

Tamms

SILICA

Amorphous, Crystalline and Diatomaceous in various grades for paints, fillers and enamels.

MAGNESIUM SILICATE

A finely ground, very white extender pigment and suspension medium.

CHINA CLAY AND KAOLIN

The purest, smoothest and whitest clays produced. Ideal for pastes and cements.

WHITING

Imported and domestic grades for paints and fillers and also for the pottery trades.

DIATOMACEOUS EARTH

A special grade for paint grinders' use as a suspension and flattening agent.

ALSO MINERAL BLACK AND RED OXIDE

Send for prices and samples.

DEPT. RM-75

TAMMS INDUSTRIES, INC.

228 N. LA SALLE ST., CHICAGO 1, ILL.

When inquiring check 5056 opposite last page

MATERIALS

Oil additives up VI, thicken less than similar products

Uses: For improving VI of lube oils.

Features: Additives thicken the oil less for a given viscosity index level than do similar products, thus permitting wider latitude in compounding and reduced use of additive.

Description: Active ingredient is a polymerized polyester. The product with the higher number has a higher mw. These are firsts of a proposed series.

(Omavis 10 and 20 are products of Olin Mathieson Chemical Corp., Dept. CP, 460 Park Ave., New York 22, N.Y. . . . or for more information check 5057 on the convenient Reader Service slip which is located opposite last page.)

Non-toxic antioxidant

Butylated hydroxy toluene has been found essentially non-toxic at concentrations well in excess of those permitted by federal agencies. Eight-page bulletin tells all about compound and its use in human consumer goods, animal feeds, and packaging materials. Bul "Antioxidant AC-3" — Catalin Corporation of America, Dept. CP, 1 Park Ave., New York 16, N. Y. Check 5058.

PVAc emulsion imparts high gloss, spreading ease to latex paint

No objectionable odor, rapid drying

Uses: As an emulsion for high-gloss, water-thinned, latex paint.

Features: When viewed with gloss meter, white paints made from formulation register 75-85 gloss units on 0-100 scale. Paint produced from emulsion can be applied easily and quickly, has no objectionable odor, dries rapidly, permits easy stain removal, can withstand scrubbing, and presents

"Alamask"

SPECIALLY DESIGNED ODOR CONTROL CHEMICALS FOR MALODORS TRACEABLE TO

AMINES
TALL OILS
CREOSOTE
BUTYL CELLOSOLVE
AMMONIA SOLUTIONS

Alamask odor control chemicals reduce the intensity of a wide variety of obnoxious malodors such as these, found in both processing operations and finished products. Rhodia's technical engineers will offer specific recommendations to solve your odor problems. Samples and directions for use are available upon request.

Rhodia INC. 60 East 56th St. New York 22, N.Y.
PHILADELPHIA • CINCINNATI • CHICAGO • LOS ANGELES
CANADA: NAUGATUCK, MONTREAL
MEXICO: COMERCIAL REKA, MEXICO CITY

When inquiring check 5059 opposite last page

Glider BLUE PRINT RACK

FOR ARCHITECTS, ENGINEERS, CONTRACTORS & FACTORIES

NOW EASY TO FILE EASY TO FIND YOUR BLUE PRINTS

20

Exclusive features:

- 1 No holes to punch.
- 2 Insert sets of prints easily.
- 3 Replace any sheet without removing other sheets.
- 4 Various sizes of prints accommodated.
- 5 No protruding ends of clamps.

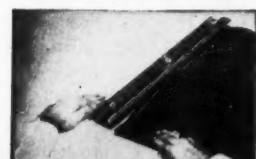


3 ft. high
4 ft. wide
3 ft. deep

ORDER TODAY OR WRITE FOR BROCHURE

\$94.50

- 6 Each plan-holder clamp holds from 1 to 100 prints.
- 7 The "Glider" can hold 12 to 18 sets.
- 8 Clearly visible index shows location of sets.
- 9 No bolts that scratch furniture.
- 10 Easily adjustable tracks allow for varying thicknesses of sets.



MOMAR INDUSTRIES

4323 West 32nd Street • Chicago 23, Illinois • LAfayette 3-1633

When inquiring check 5060 opposite last page

CHEMICAL PROCESSING

no fire cation.

Descr high-glo partly in ting age loids an extreme resin of sion.

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(PVAc oped by of Am Madison N.Y. CH posite 1

Over 1

Conden discuss for ma Among rubber polishes water ishes, 1 and an 97 — S General CP, W 5062.

SOL STOC



Thanks to The Re Bridgepo

AUGU

MATERIALS

no fire hazard during application.

Description: Secret behind high-gloss formulation lies partly in selecting proper wetting agents and protective colloids and partly in producing extremely fine particles of resin of proper mw in emulsion.

When formulated into paint and stored in can, particles of resin do not touch each other. When paint is spread, water in which they are dispersed evaporates and particles fuse within minutes to form tough, durable surface.

(PVAc emulsion was developed by Celanese Corporation of America, Dept. CP, 180 Madison Ave., New York 16, N.Y. Check 5061 on form opposite last page.)

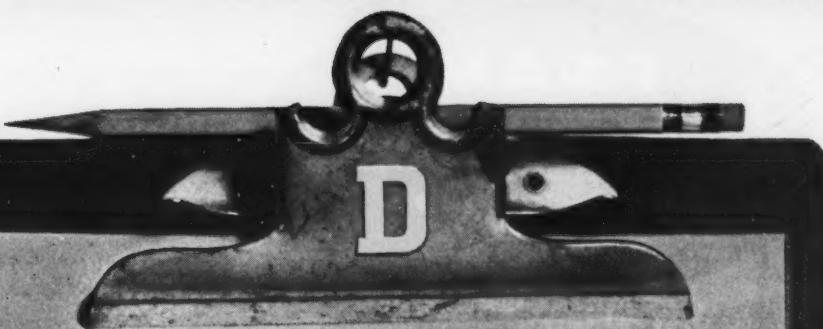
Over 115 silicone uses

Condensed eight-page catalog discusses over 115 applications for manufacturer's silicones. Among uses described are rubber products, cosmetics and polishes, electrical insulation, water repellents, textile finishes, lubricants, and release and anti-foam agents. CDS-97 — Silicone Products Dept., General Electric Co., Dept. CP, Waterford, N.Y. Check 5062.



"Turpentine!"

Thanks to an idea by A. A. Schilling, The Remington Arms Co., Inc., Bridgeport, Conn.



Check on Syloids by Davison

- ✓ Flatting agent for vinyls, lacquers and varnishes
- ✓ Thickening agent for resins and inks
- ✓ Reinforcing agent for adhesives
- ✓ Anti-caking agent
- ✓ Anti-gassing agent for metallic paints
- ✓ Ink offset preventative
- ✓ Anti-blocking agent

For more information write today

Progress Through Chemistry

DAVISON CHEMICAL COMPANY

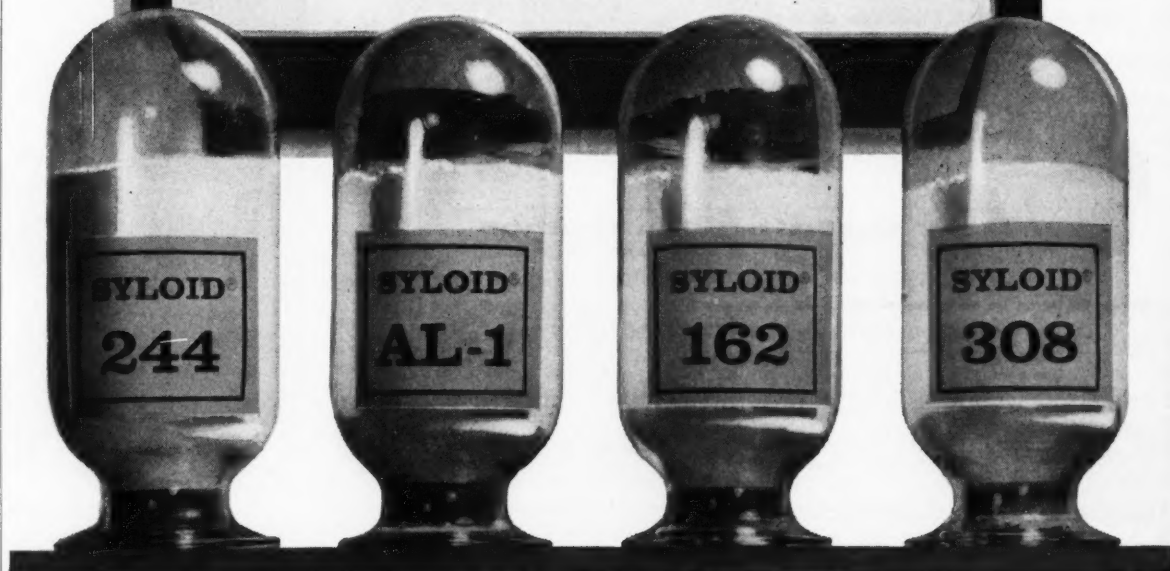
Division of W. R. Grace & Co.

Baltimore 3, Maryland

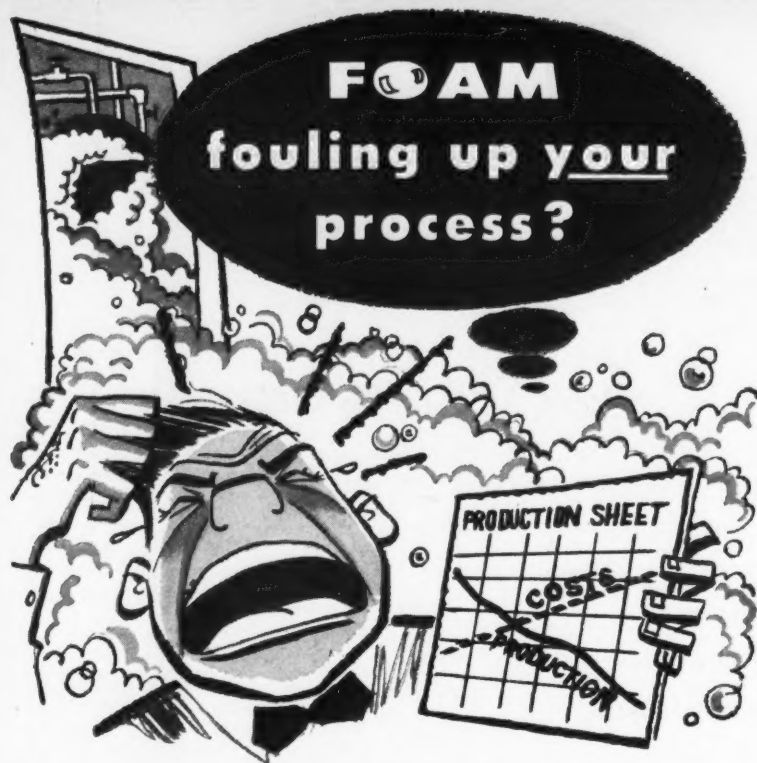


Sales Offices: Baltimore, Md.; Chicago, Ill.; Columbus, Ohio; San Francisco, Calif.; Houston, Texas; New York, N. Y.

Producers of: Catalysts, Inorganic Acids, Superphosphates, Triple Superphosphates, Phosphate Rock, Silica Gels, Silicofluorides, Rare Earths and Thorium. Sole Producers of DAVCO® Granulated Fertilizers.



When inquiring check 5063 opposite last page



Get a Dow Corning Silicone Defoamer!

Whatever your foaming problem, there's a Dow Corning silicone defoamer that will help solve it at an amazingly low cost.

Just a teaspoonful of a Dow Corning silicone defoamer can prevent mountains of foam . . . enabling you to utilize full productive capacity and put your processing into high gear. What's more, when you eliminate foam, you say goodbye to wasteful boilovers and the fire hazards they may present.

. . . So, stop frothing about those FOAM problems—eliminate them with a Dow Corning silicone defoamer. They're the most versatile and efficient foam killers ever developed!

FREE SAMPLE and INFORMATION—

To receive a generous trial sample of a Dow Corning Silicone Defoamer, return coupon below or write on your letterhead. No obligation, of course.



Dow Corning CORPORATION
MIDLAND, MICHIGAN

NAME _____			3220
TITLE _____			
COMPANY _____			
CITY _____	ZONE _____	STATE _____	

My foamer is

Oil system _____
Aqueous system _____
Food products _____
Other _____

When inquiring check 5064 opposite last page

CHEMICAL MATERIALS

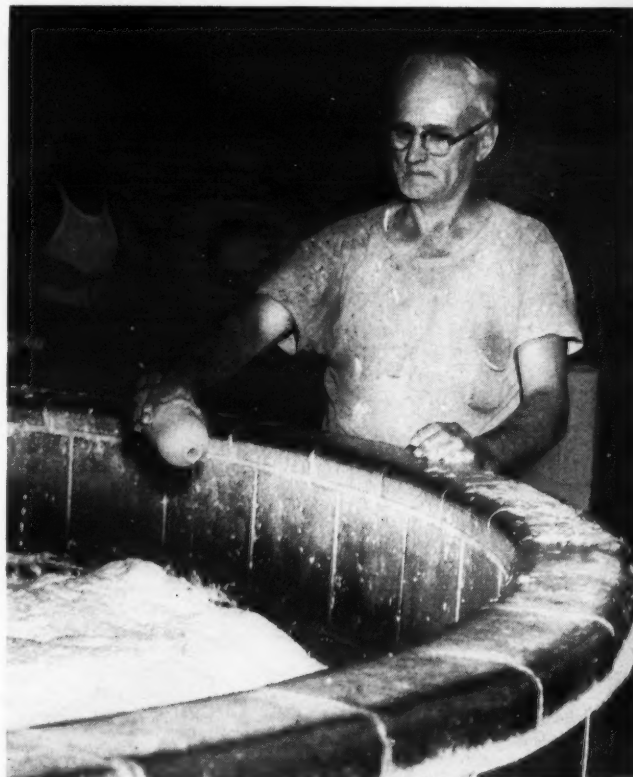
Organo-tin compound uses fresh approach to control slime in pulp and paper processing. When added to the system, agent is believed to attack the nervous system of bacteria instead of the digestive tract — slime organisms can't build up a tolerance.

Eliminate slime economically and efficiently

Conventional methods for controlling slime in pulp and paper mills, cooling systems, and other closed and semi-closed systems, call for adding a chemical which attacks the organisms' digestive tracts. This results in build-up of tolerance and necessitates dosing the system with two or more chemicals alternately — and often with diminishing effect.

Slime not only clogs screens and reduces heat transfer rates, but may even cause spotting and breaking of paper in paper mills, resulting in costly downtime.

Currently-used chemicals for controlling slime are usually very toxic and involve handling hazards. In general, their solubility in water is quite low. These compounds all work by poisoning the or-



CHEMICAL PROCESSING

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5066.

AUG

ganism which cause the slime, but have the disadvantage that the organisms can build immunity.

Recently, an agent which is believed to attack the nervous system of the organism has been discovered. Concentrations necessary to completely inhibit growth of offending organisms are equal to or less than that of conventional control agents. Effectiveness is independent of pH.

Toxicity and irritation to humans is also much less. (LD₅₀ on rats of an aqueous suspension is 175 mg/kg of body weight). In aqueous solution, the new compound shows no measurable corrosive effect on construction metals.

Chemically the compound is bis (tri-n-butyltin) oxide, (C₄H₉)₆Sn₂O, and designated by the manufacturer as TBTO (trade mark). A colorless liquid, free from objectionable odor, compound is a high-efficiency, broad-spectrum control agent.

Additions of from 0.2 to 0.8 oz/ton of finished product will control mild to severe infestations.

The control agent should be added one to two times per shift. Addition may be in "slugs" or gradually. Continuous addition at a rate of 300 to 1000 ppm on dry weight of finished product will protect pulp and finished paper from mildew. Use of compound on raw materials intended for food containers is not recommended.

(Tri-n-butyltin oxide is a product of Chemical Div., Metal & Thermit Corp., Dept. CP, Rahway, N.J. . . . or for more information check 5065 on form which is located opposite last page.)

Microcrystalline waxes

Survey of specifications of many grades of microcrystalline waxes found in three major groups (hard, emulsifiable, and plastic) are in 14-page brochure. Uses are indicated. Microcrystalline waxes — Bareco Wax Co., Div. of Petrolite Corp., Dept. CP, PO Box 390, Kilgore, Texas. Check 5066.

BRIEFS

for buyers of

Caustic Potash Sodium Sulfides Inert Lubricants Sodium Chlorate

Facts on caustic potash

While there are a few growing uses for dry forms of caustic potash (notably the powder and flake), about 8.5 out of every 10 pounds of KOH purchased in the U.S. are bought as liquid, either standard or low chloride grade.

Reasons for this are pretty clear: liquid KOH is easier to handle than solid forms, and cheaper to buy (particularly in the higher concentrations).

Shipping strength of liquid KOH is limited, by its penchant for crystallizing in cool weather, to a narrow range between 45% and 52%. Big-volume users sometimes order 52% to keep freight cost down; this is about the practical limit on strength.

NIALK® liquid caustic potash is regularly shipped at 45% to 52% concentration. It is extremely low in iron content.

If your process economics favor a solid form of KOH, you can get a wide choice by specifying NIALK brand. We ship 90% caustic potash as fused solid, flake, granular, walnut, broken, powder, or crushed. ("Walnut" is used in liquefying air; flake and powder often go into cleaning compounds, mixed with caustic soda, soda ash, metasilicates, and phosphates.) We also supply 85% KOH in flake or solid form.

KOH is a "specialty" alkali. You buy it for specific properties you just can't get from other alkalis. Making it takes special skills, too.

You can have confidence in the same skill that pioneered caustic potash on this continent and has supplied NIALK KOH for half a century. We continue to supply a major portion of the total requirements of this country.

Can you pass this sulfide quiz?

Here's a quick way to tell if you're getting good value in the sodium sulfide and sodium sulfhydryte you buy:

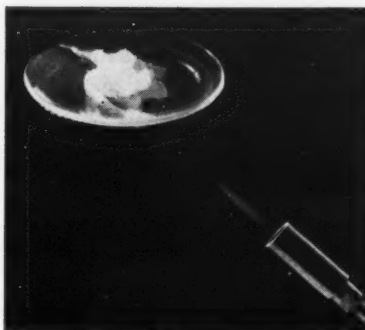
1. Do you always receive sulfide or sulfhydryte in brand-new drums?
2. Is every drum lacquer-lined to prevent iron contamination?
3. Is iron content consistently lower than 10 ppm?
4. Are drum lids sealed so they can't pop open in handling or storage?
5. Can drums be resealed easily?

If you have to say "no" to any of these questions, you're probably risking some contamination in your process. To some, this is a serious matter.

Even if it isn't serious, why put up with it at all—when you can get sodium sulfide or sulfhydryte that's virtually

iron-free, protected by all the safeguards mentioned above?

To do so, simply write *Hooker* on your next purchase order for either of these products. Why not order a trial quantity now?



You can't burn this grease

You may at first be discouraged at the things you *can't* do to this product. But therein lies its value.

Besides being completely nonflammable, it won't break down in the presence of oxygen, hydrogen peroxide, concentrated mineral acids and alkalis. It's unaffected by heat up to 300° C; is stable at very low temperatures, too; is odorless and nontoxic.

What's its name? FLUOROLUBE®. It's a high-density addition polymer of trifluorovinyl chloride. The basic polymer can be fractionated into many grades, ranging from low-viscosity colorless oils through heavy oils to opaque greases. All have excellent lubricating qualities.

Fluorine and chlorine, accounting for nearly 80% of the molecule, contribute to the high densities and complete fire safety of FLUOROLUBES.

What *can* you do with them? Some suggestions: lubricate ultraprecision instruments; seal pumps, valves, pipe joints in equipment handling oxygen, hydrogen peroxide, nitric acid, and other corrosives; lubricate PVC fittings, plug cocks, vacuum pumps in highly corrosive service.

You'll find other ideas on use, plus specifications and typical properties, in a data file on FLUOROLUBES which you can get by checking the coupon.

More NaClO₃ coming

Thanks to our OLDBURY® Products plants at Niagara Falls, N. Y., and Columbus, Miss., we're presently the nation's largest producer of sodium chlorate. But even that isn't good enough to meet *tomorrow's* needs.

The Columbus plant has been in production since 1954. Last summer we upped its capacity by 5,000 tons per year. Now we're building again. By early 1958, another 5,000 tons yearly will be on tap.

Assuming you're in the market for sodium chlorate, may we submit these three reasons for making Hooker your supplier:

1. Fastest service you can get east of the Rockies.
2. Skilled technical help when you need it.
3. Sodium chlorate of 99.5% minimum purity.

May we spell out these advantages for you in more detail? If so, just write to *Hooker Electrochemical Company* at the address given below.

For more information on chemicals mentioned on this page, check here:

- | | |
|---|--|
| <input type="checkbox"/> Caustic Potash | <input type="checkbox"/> FLUOROLUBES |
| <input type="checkbox"/> Sodium Sulfide | <input type="checkbox"/> Sodium Chlorate |
| <input type="checkbox"/> Sodium Sulfhydryte | <input type="checkbox"/> New list of products—Bulletin 100-A |

Clip and mail to us with your name, title, and company address.
(When requesting samples, please use business letterhead.)

HOOKEE ELECTROCHEMICAL COMPANY

508 FORTY-SEVENTH STREET, NIAGARA FALLS, N. Y.

NIAGARA FALLS • TACOMA • MONTAGUE, MICH. • NEW YORK • CHICAGO • LOS ANGELES

HOOKEE
CHEMICALS
PLASTICS

When inquiring check 5067 opposite last page

Mono Laurates Di

of
Diglycol
Ethylene Glycol
Diethylene Glycol
Polyethylene Glycol
Propylene Glycol
Polyoxyethylene
Butoxyethyl
Glycerine

MADE TO MEET YOUR SPECIFICATIONS



THE FLAME AND THE FLASK—SYMBOL OF QUALITY

The C.P. Hall Co.
CHEMICAL MANUFACTURERS

5147 W. 67th Street, Chicago 38, Illinois
AKRON, OHIO • NEWARK, N. J.
CHICAGO, ILL. • LOS ANGELES, CAL.

When inquiring check 5068
opposite last page

MATERIALS

Economical detergents and wetting agents for textiles

Good foamers in neutral,
acid, mild alkaline systems

Uses: As economical multi-purpose detergents and wetting agents for all types of wet textile processing operations.

Features: Materials are excellent wetting, dispersing, penetrating and cleansing agents. They provide good foaming action in neutral, acid, and mild alkaline systems. Liquids are easy to handle and have low cloud points.

Description: Sul-fon-ate X-35-L is sodium salt of an alkylaryl sulfonate. It is straw-colored liquid, containing 35% total solids. pH (product): 6.3 ± 0.5 .

Sul-fon-ate X-60-LT is triethanolammonium salt of an alkylaryl sulfonate. It is light yellow-brown liquid, containing 60% total solids. pH (product): 7.0 ± 0.5 .

Sul-fon-ate X-50-L is mixed sodium/triethanolammonium salt of an alkylaryl sulfonate. It is straw-colored, contains 50% total solids. It has pH(product) of 8.5 ± 0.5 .

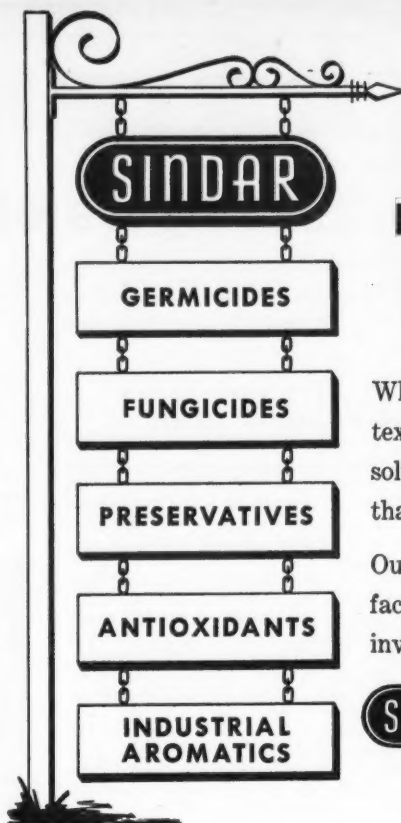
(Sul-fon-ates X-35-L, X-60-LT, and X-50-L are products of Tennessee Corp., Dept. CP, 1330 W. Peachtree St., N.W., Atlanta 9, Ga. . . or check 5069 opposite last page.)

Produces rare organics in pilot-scale quantities

An extensive line of organic intermediates is being produced in pilot plant or commercial scale amounts.

Types available include: primary amines, acetoacet aryl-amides, nitro and chlorinated compounds, pyrazolones, sulfonic acids and salts, alkoxy and hydroxy compounds, and carboxylic acids.

(Organic intermediates are produced by Pfister Chemical Works, Dept. CP, Ridgefield, N.J. Check 5070 on form opposite last page.)



BRING YOUR PROBLEMS TO SINDAR!

Whether your line is soaps, paints, textiles, rubber, cosmetics, plastics, solvents...there's a Sindar product that can help you.

Our technical staff and laboratory facilities are at your service. We invite your inquiries.

SINDAR Corporation
Industrial Aromatics and Chemicals

330 West 42nd Street
New York 36, N. Y.

When inquiring check 5071 opposite last page

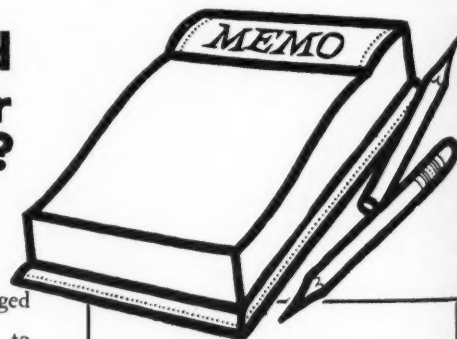
Changed Your Address?

BE SURE TO LET US KNOW!

If you have recently changed your address you'll want to make sure that your copy of CHEMICAL PROCESSING continues to reach you . . . just use this convenient form.

Please answer all the questions as completely as possible.

**Mail request to
Reader Service Dept.
Chemical Processing
111 East Delaware Place
Chicago 11, Illinois**



Former Company Affiliation
Former Address
Your Name Present Title
Present Company
Main Product
Rating of Company
Street Address
City Zone No. State

CHEMICAL PROCESSING

MATERIALS

Makes urethane coatings, adhesives that have high resistance

Isocyanate adduct combines with polyester resins

Uses: To make urethane surface coatings and adhesives.

Features: Adduct is non-toxic. Final films are chemical and abrasion resistant. In processing, protective masks and special ventilation are not required.

Description: Isocyanate resin, when used in conjunction with manufacturer's Multron polyester resins, is equal or superior to Mondur C in work life, drying time, film hardness, solvent and impact resistance.

(Mondur CB is a product of Mobay Chemical Co., Dept. CP, 1901 S. Second St., St. Louis 4, Mo. . . . or for more information on manufacturer's product check 5072 on Reader Service slip which is located opposite last page.)

High absorption, low odor with analgesic

Glycol monosalicylate is now commercial

Uses: Topical analgesic and mild skin irritant also shows promise as an UV screening agent for suntan lotions.

Features: Free from "liniment odor," has higher rate of absorption through skin than other salicylate esters. Lower volatility, higher viscosity give formulating advantages.

Description: Glycol monosalicylate has been small-volume specialty imported from Europe. It is now produced in commercial volume in US.

(Glycol monosalicylate is available from Organic Chemicals Div., Monsanto Chemical Co., Dept. CP, 1700 S. Second St., St. Louis 4, Mo. . . . or for more information check 5073 on the convenient Reader Service slip which is located opposite last page.)



this new carbon-based filteraid has definite advantages for 89 caustic producing plants

These are the plants producing caustic by the electrolytic or diaphragm method, who have had trouble with previously available filteraids . . . the silica solubility of diatomite was undesirable, and cellulose filteraids were high in price and broke down under high temperatures.

NEROFIL is already serving a number of these plants with entire satisfaction. Being pure carbon, there is no solubility, even at elevated temperatures in 50% caustic. Being a truly processed filteraid, not just crushed carbon, it produces excellent clarity, and gives flowrates equal to many grades of diatomite. Filter cake density is low, and cake porosity is high, making NEROFIL the first really satisfactory filteraid for strongly alkaline solutions.

Great Lakes Carbon Corporation

Nerofil Department - 612 So. Flower St., Los Angeles 17, California or
Dept. LTK - 333 No. Michigan Ave., Chicago 1, Illinois

For complete information on the characteristics and application of the new filteraid, fill out the coupon and mail it today.

NEROFIL DEPARTMENT, Great Lakes Carbon Corporation
612 So. Flower St., Los Angeles 17, California

Name _____

Position _____

Company _____

City _____ Zone _____ State _____

When inquiring check 5074 opposite last page

Need WATER-SOLUBLE

PRESERVATIVES

for aqueous solutions or emulsions of
Alginate • Casein • CMC • Dextrins •
Fingerprint • Gelatin • Glue • Gluten •
Gums • Latex • Methylcellulose •
Paints • Pectin • Polyose • Proteins •
Organic Acids • Sorbitol • Starch •

TRY

CHEMOCIDE CAA soluble at 20°C: 5 gm/100 cc

CHEMOCIDE CETB soluble at 80°C: 40 gm/100 cc

CHEMOCIDE DHS soluble at 20°C: 33 gm/100 cc

CHEMOCIDE MKS soluble at 20°C: 36 gm/100 cc

CHEMOCIDE PCA soluble at 20°C: 40 gm/100 cc

CHEMOCIDE PKS soluble at 20°C: 30 gm/100 cc

CHEMOCIDE PNA soluble at 20°C: 50 gm/100 cc

4-page technical data sheet, showing chemical composition and antimicrobial spectrum sent upon request.

CHEMO PURO

**MANUFACTURING
CORPORATION**

150 Doremus Avenue, Newark 5, N. J.

When inquiring check 5075 opposite last page

MATERIALS

'Rigidized' Teflon much improved mechanically

Superior load-, temperature-, and wear-resistance

Uses: As bearings, valve guides, pressed washers, sleeve caps and bearings, bushing, inserts, rotating mechanical seals, gaskets, and other related applications.

Features: Reinforcing agents make Teflon reasonably stable at 575°F and impart improved load, temperature, coefficient of friction, and wear-resistance characteristics.

Description: Rigidized (filled) Teflon is available in tape, rod, tube, and slugs. Material machines well and does not cause undue wear on carbide tools.

(Enflon is product of Enflo Corporation, Dept. CP, Route #38 at Airport Circle, Pennsauken, N.J. . . . or for more information check 5076 on form which is located opposite last page.)

Amide softens textiles, leather, and paper, is easy processing

Uses: As softener for textiles, leather, and paper.

Features: Amide is easily converted to cationic softener by adding small amount of acetic or formic acid to water dispersion. Softener is resistant to high processing temp and hot pressing, and gives maximum whiteness on white surfaces. It does not affect colors on dyed or printed goods.

Description: Softener, 100%-active amide, is white, waxy solid of low surface tension. It is economical to use: only ¼-1% of weight of goods treated is necessary.

(Softener 64 is product of Glyco Products Co., Inc., Dept. CP, Empire State Bldg., New York 1, N.Y. . . . or for more information about manufacturer's product reader may simply check 5077 on form opposite last page.)

Provides better resistance to acid and hot oil

Reinforced phenolic has high impact strength

Uses: As a one-step phenolic molding compound.

Features: Compound provides better resistance to hot oil immersion and aqueous acid conditions than conventional glass-filled molding compounds.

Description: Easy-to-handle, one-step phenolic molding compound is supplied in dry form as one-inch long glass-fiber rovings, impregnated with phenolic resin. Other lengths are available.

(Durez 16771 is product of Durez Plastics Div., Hooker Electrochemical Co., Dept. CP, North Tonawanda, N.Y. . . . or for more information check 5078 on form opp. last page.)

Coating-molding material

Booklet of 12 pages explains properties and applications of specially-formulated, high-mw polyvinyl dispersion as coating or molding compound. Fold-out chart provides data on compounds now in use. Bul 143 on Chem-o-sol® — Chemical Products Corp., Dept. CP, King Philip Rd., East Providence, R.I. Check 5079.

Water-soluble accelerator works successfully from 70 to 300°F

Provides tighter cure, has good aging characteristics

Uses: An ultra-accelerator for natural and synthetic latex compounds.

Features: Completely water-soluble, accelerator can be used over wide range of curing temperatures from 70 to 300°F. It provides tighter cure, has excellent aging characteristics.

Description: For natural latex, 1 to 2 parts of liquid dithiocarbamate accelerator are recommended for every

MATERIALS

100 parts of latex solids. For synthetics, 1 to 3 parts can be used per 100 parts of latex solids. Accelerator is diluted 1:2 with water, prior to adding to latex.

(Vulcure NS is product of Alco Oil & Chemical Corp., Dept. CP, Philadelphia 34, Pa. Check 5080 located opposite last page.)

Sesquiterpene fractions in commercial quantity

Three grades are obtainable

Uses: For chemical synthesis, perfumery, and flavor formulations.

Features: Products are available for first time in commercial quantities.

Description: Composition and physical properties are:

	Mixed
β -Caryophyllene (%)	75-80
Sp gr (@ 25°C)	0.895
Optical rotation (10 cm tube)	-12.4°
n _D 25	1.4950
D	
Color	water white-pale straw
Beta	Crude
90	45
0.895	0.910
-7.7°	-2.2°
1.4960	1.5015
water white-pale straw	Amber

(Sesquiterpene fractions are products of Southern Chemical Div., The Glidden Co., Dept. CP, Jacksonville 1, Fla. . . or for more information about manufacturer's product check 5081 on form located opposite last page.)

Improves resins

Reprint of 16 pages describes high polymer alkyd techniques which improve properties of resins. When applied to conventional formulations, technique produces resins with faster drying times, improved alkali and detergent resistance, better color and color retention and flexibility. "High Polymer Alkyd Technique" — Heyden Newport Chemical Corp., Dept. CP, 342 Madison Avenue, New York, N. Y. Check 5082.



Dowicide preservatives prevent product breakdown

... protect quality in canned products

In tests on two emulsion liquid floor wax samples stored for two weeks at 98°F., one sample remained pure, liquid and uniform. The other became putrid, viscous, discolored and completely unusable, due to bacterial action.

The two samples were identical except for one important difference: the one *not* affected by bacteria had been treated with a Dowicide® preservative. The dual job of protecting quality and prolonging the effective life of

canned products through control of bacteria and fungi is an important one. And it's one that Dowicide preservatives do extremely well.

If your product is anything short of perfection, one of fourteen Dowicide preservatives may possibly improve it. Let our laboratories help you choose the right one. For specific information, return the coupon to us. THE DOW CHEMICAL COMPANY, Midland, Michigan.

THE DOW CHEMICAL COMPANY,
Dept. DP 401C-1, Midland, Michigan

Please send me further information on the uses of Dowicide preservatives for:

NAME _____ TITLE _____ ☐ paint ☐ pulp and paper ☐ ceramics
FIRM _____ ADDRESS _____ ☐ adhesives ☐ cutting oils ☐ petroleum
CITY _____ STATE _____ ☐ building materials ☐ other (specify) _____

YOU CAN DEPEND ON

DOW

When inquiring check 5083 opposite last page



This issue of **CHEMICAL PROCESSING** is *different*. Lay this copy alongside an earlier issue (before July) of CP . . . compare them. Hold the new issue in your hands . . . slip it into your brief case. It "fits" . . . it invites easy reading . . . for busiest-of-all chemical executives.

IT NAMED ITSELF "THE EXECUTIVE SIZE" . . .

for the new format has been styled for today's busy executives . . . expanded main editorial sections covering subjects vital to the management team in chemical processing industries . . . prepared in the established Putman editorial style.

AN EARLIER ORIGINAL DESIGN IMPROVES . . .

Nineteen years ago Putman Publishing Company created the original design for business magazines, known as "King Size" . . . bringing heretofore

unknown visibility and greater effectiveness in editorial presentation (yes, for advertising, too). Scores of other magazines adopted this format, and use it today.

Now, the "Executive Size" brings you new advantages . . . while retaining the best of the old.

Turn to page 46. Look at the unusually effective presentation of the editorial matter . . . the "cinemascope" wide-screen layout.

Leaf anywhere through the magazine . . . editorial material *everywhere* . . . front and back. No solid sections of advertising pages . . . newspaper-width editorial columns invite easy reading throughout.

We think you'll find the new "Executive Size" of **CHEMICAL PROCESSING** easier to read, more interesting. Don't you agree? We'll welcome your comments.

All Putman magazines now appear in this new "Executive Size" . . . FOOD PROCESSING, FOOD BUSINESS, INDUSTRY POWER, as well as CHEMICAL PROCESSING.

PUTMAN PUBLISHING COMPANY

111 E. DELAWARE PLACE • CHICAGO 11, ILLINOIS



"Executive Magazines for Industry"

MATERIALS

**Said to accelerate ignition,
improve lube qualities
of diesel-oil fuels**

Sulfur derivative promising
as synthesis intermediate

Uses: Investigations indicate applications as intermediate for manufacture of pharmaceuticals, dyestuffs, rubber chemicals, and lube additives.

Features: Chloride is reported to accelerate ignition and improve lubricating qualities of diesel-oil fuels, and to be vulcanizing agent for GR-S rubber and for natural rubber in presence of elemental sulfur. It holds promise as intermediate in many fields of synthesis.

Description: Sulfur derivative is white solid compound, stable at normal temperatures, but readily sublimed. It is soluble in broad range of organic solvents.

(Trichloromethanesulfoyl chloride is product of Stauffer Chemical Co., Dept. CP, 380 Madison Ave., New York 17, N. Y. Check 5084 on form opposite last page.)

**Has brightening effect
under artificial light
when used on Dacron**

Uses: To produce brilliant clear whites on Dacron. Heretofore, it was necessary to employ chemical bleaching.

Features: Brightening effect of agent is noticeable under artificial as well as natural light. Agent has good resistance to washing, atmospheric fading, pressing, perspiration acid, alkaline spotting, and light.

Description: Optical bleaching agent is practically unaffected by pH and may be applied in Textone bleach bath, an antichlor treatment, or in an oxalic acid/ammonium bifluoride graphite removal operation.

(Tinopal E. Liquid is product of Geigy Dyestuffs, Div. of Geigy Chemical Corp., Dept. CP, Ardsley, N.Y. . . . or for more information check 5085 on form opposite last page.)

NOW-Assured Supply

...from

Antara



★ **NOW IN FULL PRODUCTION**—Antara Chemicals' new surfactants plant at Calvert City, Ky.

● Linden, N. J. and Rensselaer, N. Y., plants and warehouses, where surfactants are produced and stored.

✱ Tank farm at Alameda, Calif., supplied in bulk by ship from Linden, N. J.

● Additional warehouses, where supplies of all surfactants are kept for speedy delivery.

Charlotte, N. C.

Houston, Tex.

Chattanooga, Tenn.

Providence, R. I.

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Portland, Ore.

Los Angeles, Calif.

San Francisco, Calif.

Antara's new surfactant chemicals plant at Calvert City, Ky. is now in full production of **Alkylphenols**, **Igepal®** and **Allpal®**. This represents another step in GAF's program to assure continuity of supply by means of multi-plant production facilities and nation-wide distribution points.

Antara is now in an even better position to assure you of speedy delivery in bulk or drums regardless of your plant's location.

From Research to Reality



ANTARA. CHEMICALS

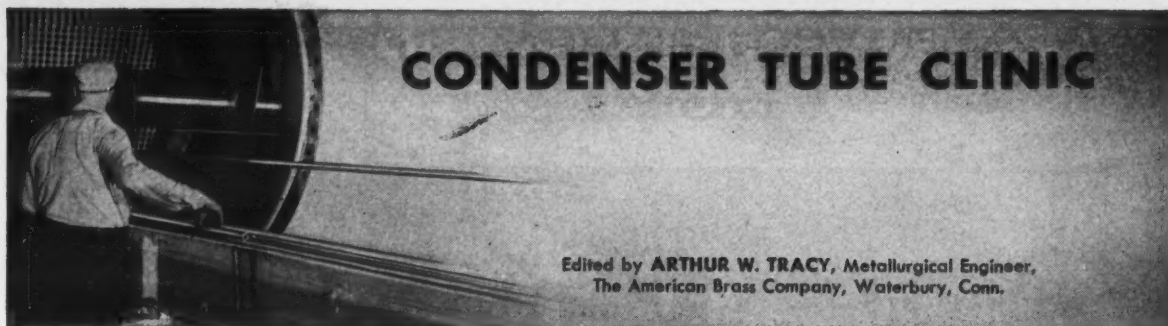
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SALES OFFICES: New York • Boston • Providence • Philadelphia • Charlotte • Chattanooga • Chicago
Portland, Ore. • San Francisco • Los Angeles. IN CANADA: Chemical Developments of Canada, Ltd., Montreal

When inquiring check 5088 opposite last page



CONDENSER TUBE CLINIC

Edited by **ARTHUR W. TRACY**, Metallurgical Engineer,
The American Brass Company, Waterbury, Conn.

Some operating factors that affect tube life

COMPOSITION OF THE COOLING WATER

The quantities of cooling water used in condensers preclude any treatment to make the water less corrosive, except where the water is recirculated. Economics often does not permit locating a power plant at a site where water is not corrosive.

In general, however, plants located inland will have relatively noncorrosive cooling water. Plants situated on tidewater will have corrosion problems, especially if the water is polluted with industrial or domestic sewage and conditions are such that organic matter in the sewage can ferment under anaerobic conditions, with the consequent formation of sulfides. Water in an enclosed harbor or dead-end channel, where the water is more or less stagnant, is particularly subject to infestation by anaerobic bacteria.

PREVENTIVE MAINTENANCE

Frequent cleaning of tubes to remove slimes containing bacteria and the simultaneous removal of sulfide scales will increase tube life. Chlorination of polluted water at frequent intervals, or periodically filling the water spaces in the condenser with chlorine gas, will not only remove the slimes but may also aid in breaking down the unwanted sulfide films which have formed on the inner walls of the tubes.

In some cases, it may be possible to dredge the channel bottom near the



An American Brass Company Chemist uses Photo-Electric Colorimeter to analyze cooling water samples as a basis for tube alloy selection.

water intake to remove accumulations of decaying vegetable matter.

MEDIA BEING COOLED OR CONDENSED

It is not usually possible to change the corrosive properties of products being handled in the process industries. The venting of noncondensable gases, however, will markedly increase tube life. This is particularly true on the steam side of boiler feed-water heaters and other steam-heated equipment where accumulations of oxygen, carbon dioxide, and ammonia can cause rapid failure of condenser tubes.

TEMPERATURE

The corrosion rate of metals usually increases with increasing temperature. This is a problem particularly in re-

finery condensers where water velocities are often relatively low and the water temperature is relatively high. At low water velocities, the formation of gas bubbles on the water side of a tube can initiate pitting which may continue even after the bubble has disappeared. In such cases, a judicious increase in water velocity will insure longer tube life, provided the velocity is not increased to a point where impingement corrosion can occur.

Many believe that condenser tubes put in service in the winter when water is cool will last longer than those started in the summer. A more protective film of corrosion products forms on the tube wall in winter, probably because the water is freer of sulfides.

TECHNICAL HELP IN SELECTING TUBES

Your situation may require special consideration and analysis. We are always ready to help and advise in the selection of the right alloy to give best service. Address: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont.

ANACONDA®

Tubes and Plates for
Condensers and Heat Exchangers
Made by
The American Brass Company

PHYSICAL PROPERTIES OF ANACONDA CONDENSER TUBES*

ALLOY	Tensile Strength, psi	Yield Strength at .5% Elongation Under Load, psi	Elongation in 2", %	Rockwell Hardness, B Scale	Density, lb. per Cu. In.	Thermal Conductivity, B.T.U./Sq. Ft./In./Hr./°F. at 68° F.	Average Coefficient of Linear Thermal Expansion per °F. (77-572 F.)
Arsenical Admiralty-439	52,000	22,000	60	6-45	0.308	768	.0000112
Ambrloy-927	60,000	27,000	55	35-65	0.301	696	.0000108
Ambrloy-901	60,000	30,000	60	30-60	0.295	552	.0000099
Cupro Nickel, 30%-702	55,000	22,000	50	30-60	0.323	204	.0000090
Cupro-Nickel, 10%-735							
Light Annealed	44,000	22,000	46	25	0.323	314	.0000093
Light Drawn	60,000	37,000	15	68	0.316	1104	.0000104
Red Brass-24	42,000	15,000	50	0-30	0.316	830	.0000102
Ambronz-421	46,000	20,000	55	0-30	0.316		
Phosphorized Arsenical Copper-108							
Light Drawn	40,000	35,000	20	20-50	0.323	1344	.0000098
Hard Drawn	54,000	50,000	8	50-70			
Phosphorized Copper-103							
Light Drawn	40,000	35,000	20	20-50	0.323	2364	.0000098
Hard Drawn	54,000	50,000	8	50-70			

Note: The above values are approximate and should not be used for specification purposes. *Light annealed except as noted.

When inquiring check 5089 opposite last page

MATERIALS

Alkylated phenol product marks company's entry into additive field

Non-staining qualities of antioxidant are desirable

Uses: Material serves as antioxidant for gasoline and other petroleum, derivatives, and in natural and synthetic rubber, and plastics.

Features: It is non-staining. This is very desirable in manufacture of white side wall tires, and in certain plastics manufacturing.

Description: Marking company's entry into field of petroleum additives, white flake, non-toxic alkylated phenol is offered in two forms. Dav-Ad 101 is 100% 2,6-di-tertiary-butyl-4 methyl-phenol, and Dav-Ad 102 is 33-1/3% solution of the above in toluene.

(Dav-Ad 101 and Dav-Ad 102 are products of Davison Chemical Company, Div. of W. R. Grace & Co., Dept. CP, Baltimore 3, Md. . . or check 5090 opposite last page.)

Butyl rubber kit

Along with latest information on market developments, manufacturer's kit contains bulletin on evaluation of butyl accelerators, and study of carbon black in butyl rubber. "Butyl Rubber" — Thiokol Chemical Corp., Dept. CP, 780 N. Clinton Ave., Trenton 7, N.J. Check 5091.



"A tank car's leaking chlorine and it's drifting over toward our competitors..."

HOW *HERCULES* HELPS...

Acid helps protect steel from moisture corrosion in severe temperatures

Uses: As component of special lubricants and rust-preventive greases; as an intermediate.

Features: Acid helps protect steel from moisture corrosion over wide range of severe temperature conditions.

Description: Phenyl stearic acid is shipped as fairly viscous, pale yellow, almost odorless liquid. It boils at 250°C at 4mm pressure.

(Phenyl stearic acid is product of Barlow Chemical Corp., Dept. CP, Ossining, N.Y. . . . or for more information check 5092 on form located opposite last page.)

Stabilizes PVC

Works with both rigid and plasticized vinyls

Uses: To heat-stabilize rigid and plasticized PVC.

Features: Stabilizer imparts a high degree of clarity, doesn't exude on long exposure to strong sunlight. It gives long term stabilization at moderate concentrations and has relatively low lubrication properties.

Description: Mixed cadmium-barium-fatty acid soap (with organic inhibitor) is a free-flowing powder, is used in 1-2 phr concentrations.

(1827X is a product of Ferro Corp., Dept. CP, 4150 E. 56th St., Cleveland 5, Ohio . . . or for more information check 5093 on form located opposite last page.)

Polyvinyl, synthetic rubber

Properties and uses of manufacturer's polyvinyl materials and synthetic rubber products are tabulated in four-page bulletin. Photographs illustrate typical applications. Polyvinyl materials and synthetic rubber — B.F. Goodrich Chemical Co., Dept. CP, 3135 Euclid Ave., Cleveland 15, Ohio. Check 5094.



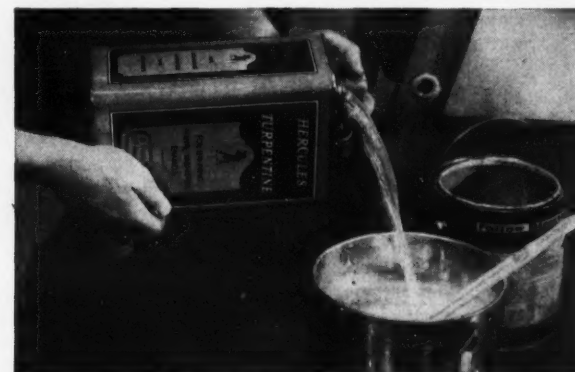
ADD COLOR TO THE PHILADELPHIA SHERATON—Lobbies, corridors, and public rooms of this newest addition to America's distinguished hotels are decorated with "Tweed," Raffi & Swanson's multicolor lacquer*. Multicolor coatings based upon Hercules® nitrocellulose add a touch of decorative

beauty wherever applied, yet are extremely durable and easily cleaned. Architects and decorators are finding multicolor lacquers add variety to a wide range of interior surfaces.

*U. S. Patent No. 2,591,904 held by Coloramic Coatings, Inc., Los Angeles.



HANDLOADERS—Hercules® smokeless powder for handloading, available in five grades, provides the ultimate in ballistic performance for the do-it-yourself shooter.



MAKE PAINT GO FURTHER—Hercules® Steam Distilled Wood Turpentine, a dependable thinner on the market for more than 30 years, keys paint to the surface, makes it less liable to crack or scale. Available everywhere in pint, quart, gallon, and 5-gallon orange and black cans.



HERCULES POWDER COMPANY

900 Market St., Wilmington 99, Del. Sales Offices in Principal Cities

CHEMICAL MATERIALS FOR INDUSTRY

HERCULES

When inquiring check 5095 opposite last page



IDEAS: from other industries and nuclear field . . .
new trends in research, processes, services

Inexpensive as sand filter— but a thousand times more efficient

- Package diatomaceous filter has plastic fiber-glass leaves, resistant to corrosion, denting, micro-leakage, sliming-over
- Skid-mounted, it's ready for operation, complete with push-button backwash and recycling
- At Atlantic Refining, removes oil and clay from salt brine; effluent cleaner than wildlife stream it feeds



Filter leaves consist of fiber glass frame (right), over which is stretched Saran bag (left)

PROBLEM: A tough filtration job faced the oil companies along the beach areas of Southern California. Brine from wells contains emulsified oil in amounts averaging approximately 100 to 150 ppm. Brine also contains colloidal clay, either suspended with or coated with the oil, in amounts of around 10 to 20 ppm.

Waste was being discharged into ocean streams, and had to be cleaned up so that it would not harm fish or wild life.

Solution: Atlantic Refining Company now pipe all of their oily brine to a new-design package-type pressure filter. This filter uses semi-rigid plastic filter "bags" instead of metal leaves. Filter is automatically back washed and recycled by pushing a button on control panel.

Filter unit comes mounted on skids, and was placed on Atlantic Refining site in Huntington Beach, California, via truck. Within a couple of hours, during which piping and electrical hook-up were made, filter was ready for operation.

Unit is complete with self-contained precoat and slurry feed tanks, proportioning pumps, controls for mechanical precoating and automatic feed of diatomaceous earth, and control panel with all operating instruments and controls in one spot.

Filter shell has a flaring design with adequate space at lowest

point in filter to drain all filter aid material without hang-up, back-up, or plugging. Door has quick-opening feature with positive locking.

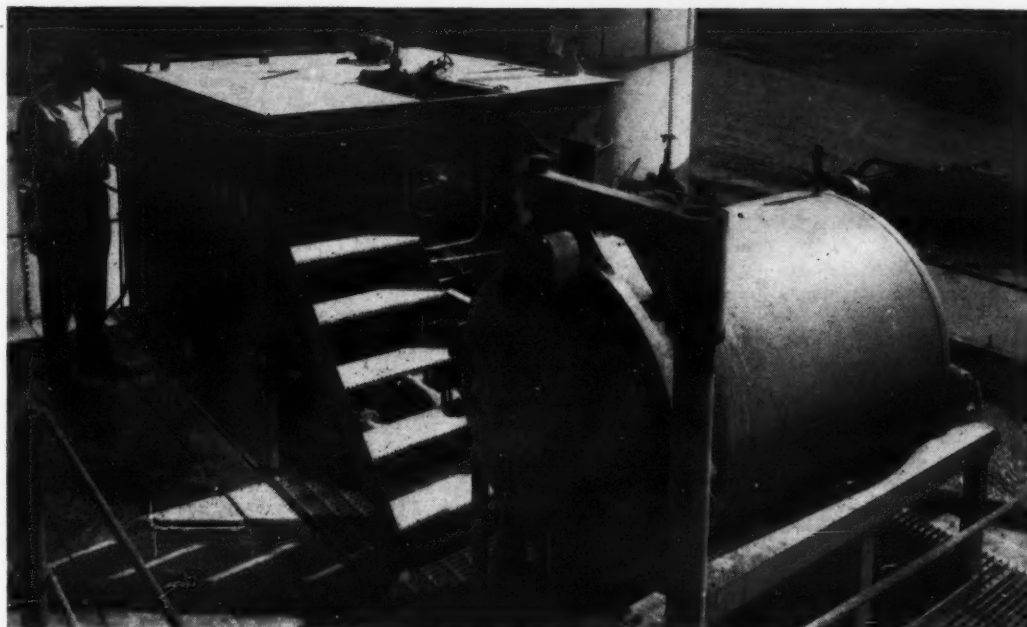
Filter leaves are unique (see photo). Entire leaf is made of fiber glass and plastic, including fittings and hardware. Each leaf consists of a Saran bag stretched over a fiber glass frame. The Saran mesh has a slick surface, which tends to forestall build-up of slime or colloidal particles which impair flow.

Leaves are rigid and are hub-

mounted. They don't require the finely machined guides which can contribute to fine leaks during course of ordinary handling in and out of filter shell. Being made of glass-reinforced plastic, they won't dent, warp, or deform during installation, cleaning, or when removed for maintenance.

All algae are removed by the filter, as well as 97 to 99% of bacteria. Depending on type of filter aid used, particle size removed can be as small as 0.002 to 0.006 microns.

Tanks, piping, and filter unit



Skid-mounted, this entire filter system, complete with push-button backwash and recycling, was delivered by truck

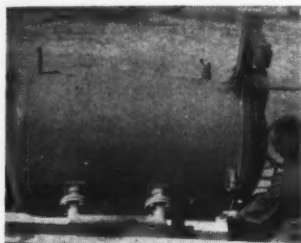
are of mild steel coated with PittChem's "Tarsel", a double-coat spray-on epoxy-coal tar system with long-lasting adhesion qualities plus high resistance to corrosion. Unit can also be obtained in Monel or stainless.

A medium flow-rate filter aid is used (Dicalite Speedplus), in conjunction with a new precoat material containing asbestos which has been developed by the filter manufacturer. Flow rate at

the Atlantic Refining installation is around 1 gal/min/sq ft of filter surface. Capacity of filter is 150 gpm. Unit occupies 10 ft by 24 ft area, including platform.

Results: Oil and clay are now removed from brine at cost of approximately 1 mil per 42-gal barrel. Effluent, containing only a fraction of ppm of solids, flows into drainage streams.

An operator visits installation once or twice a day. When needed, he backwashes the system by push-button. First he stops influent flow, then jet



Body of filter flares outward at rear to facilitate quick, thorough flushing. Note easy-access door

washes the leaves to sluice out all of the accumulated filter aid.

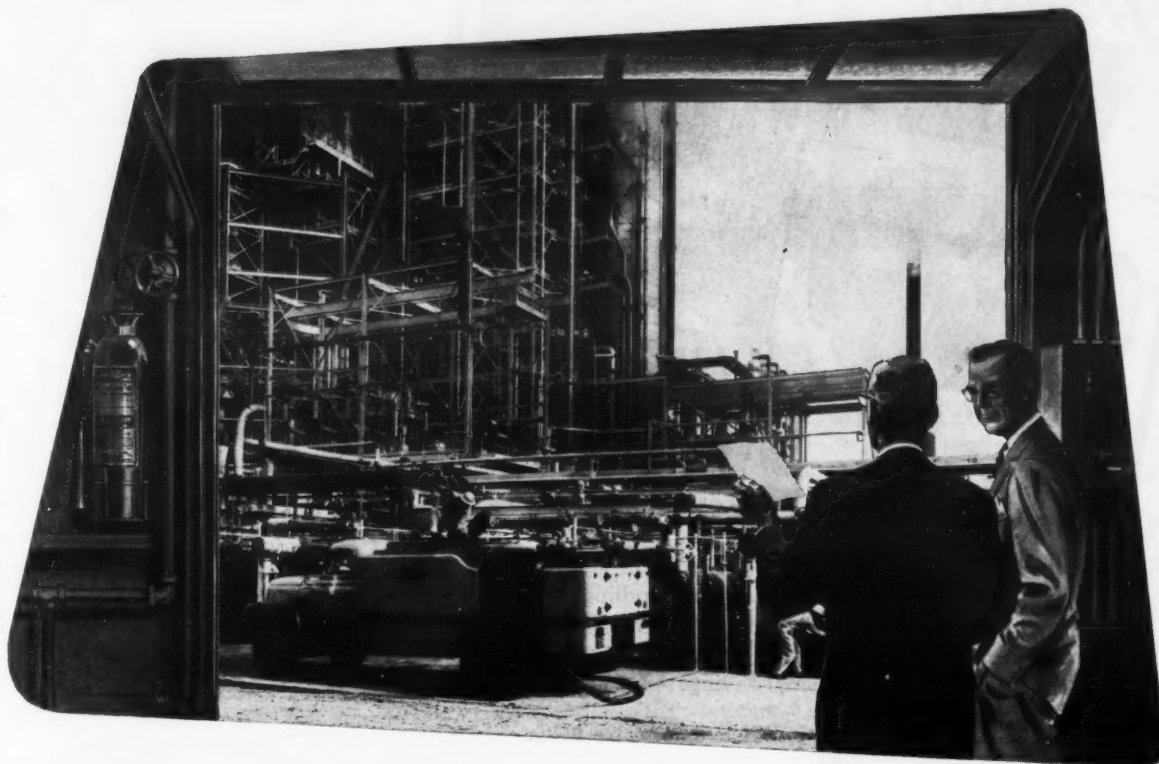
When this is complete, the pumps to precoat tanks are started and precoat material is deposited on leaves. Automatic slurry feed pumps are then turned on, flow of brine is renewed, and filter is in operation again within 15 minutes or less.

Installation costs, as well as maintenance costs, are low. No plumbing is needed — all piping is neoprene tubing.

Automatic Units Work Unattended

Completely automatic units are also available from the manufacturer. In one Texas operation, filters are visited every fourth day to fill the slurry tanks with diatomaceous earth and the precoat tanks with precoat material. Outside of that, unit is unattended. As soon as pressure in filter reaches predetermined point at around 100 psi, influent flow stops, and the spray jets sluice out all filter aid; then precoating starts, and

Dowell Service Helped This Plant Profit By Saving \$312,700 in Maintenance Costs!



To clean and service the giant catalytic crackers in today's modern refineries is quite a job . . . and very costly. Costly, that is, unless Dowell Service is on the job to help clean the "cats"—chemically. Here's an example of how Dowell chemical cleaning service cut turnaround costs for one refiner by \$312,700.

Dowell was called in to provide cat cracker turnaround service which included the cleaning of: two flue gas coolers, two catalyst coolers, four overhead aftercoolers, one light gas oil cooler, one heavy gas oil cooler, two top tray reflux coolers, and two final gas condensers.

Dowell's time: thirteen and one-half hours; Cost: \$2300.

It is estimated that this same cat cracker service, if done by mechanical methods, would have cost the refinery: 1) Additional downtime of seven days—\$210,000; 2) Additional spare bundle inventory—\$100,000; 3) Labor—\$5,000.

The refinery enjoyed a \$312,700 operating credit from this single cat cracker turnaround—not including expected efficiency increases.

Dowell provides expert service in removing scale and sludge from product, process and steam generating systems. Dowell does the job for you—furnishing all chemical solvents, trained personnel, pumping and control equipment. Furthermore, Dowell has the experience in chemical cleaning to provide assurance of a job well done.

While the example here deals with an oil refinery, Dowell chemical cleaning has recorded similar profit-making savings for other industries. Dowell engineers can show you performance data in almost any field—steel, chemical, power, paper, construction.

For specific information on how Dowell chemical cleaning can help your plant to greater profits, call the Dowell office nearest you. Or write Dowell Incorporated, Tulsa 1, Oklahoma.

have Dowell clean it chemically

DOWELL

A SUBSIDIARY OF THE DOW CHEMICAL COMPANY

When inquiring check 5096 opposite last page

Reduce your liquid handling costs!



There is no better way to cut liquid handling costs than with "John Crane" Seals. They are specially engineered for the Chemical Industry to provide these important operational savings:

- 1 Eliminating loss of expensive and corrosive fluids.
- 2 Positive sealing of toxics, thus minimizing need for costly exhaust equipment.
- 3 Substantially reduced maintenance and the man-hours involved.
- 4 Reduction of "shutdown periods" due to materially increased service-life expectancy over and above your present methods.

Ranging from the Types 1 and 2 (for services where synthetic rubber is suitable) to the Type 9 (with sealing members made of DuPont Teflon to handle any industrial chemical or corrosive)... there is a "John Crane" Seal that can be adapted to your individual conditions.

remember: Your toughest problem can be "John Crane's" next success story.

Don't wait, call us now. Get our seal catalog....

Crane Packing Co., 6421 Oakton St., Morton Grove, Illinois (Chicago Suburb).

In Canada: Crane Packing Co., Ltd., Hamilton, Ont.



JOHN CRANE

CRANE PACKING COMPANY

OFFICES IN ALL PRINCIPAL CITIES

When inquiring check 5097 opposite last page

IDEAS

Sand Filter

Starts on page 98

after a timed interval, influent flow resumes — all automatically.

Filters are available to handle capacities of from 87 to 440 gpm. They can also be used in parallel as modular units, if capacity is desired over original installation.

**As Cheap as Sand Filter
But More Efficient**

A sand filter of equal capacity would require about four times as much area in a permanent location — with less than 50% salvageable. The mobile package-type filter requires no expensive foundations, has complete salvagability and flexibility. If filter needs should change, entire unit can be moved to new job site. Maintenance of conventional sand filter is approximately 3 to 8% of value per year, against maintenance cost of only 1 to 2% per year for diatomaceous filter.

Efficiency of removing particles is high with the diatomaceous filter. When using the asbestos precoat, filtrate will contain a maximum of 0.002 to 0.006 ppm suspended solids, whereas sand filter effluent will contain from 1 to 20 ppm solids.

Backwash efficiency is greater for diatomaceous filter, which uses 2 gal/sq ft of filter surface.

Original investment for either type unit would be roughly the same for same filtration job.

(Atlas Filtreat filter unit is distributed by Magna Products, Inc., Dept. CP, 11808 South Bloomfield Ave., Santa Fe Springs, Calif. Check 5098 opposite last page.)

Phosphoric acid plants

Folder of six pages, featuring colorful flow diagram, presents information on designing and building of phosphoric acid plants. Phosphoric acid bul — The Chemical and Industrial Corp., Dept. CP, 256 McCullough St., Cincinnati 26, Ohio. Check 5099.



MASKING COMPOUNDS FOR LATEX FROM THE D&O LABS

To mask the often unpleasant odor of Natural Rubber Latex, the D&O Laboratories have developed two series of special compounds.

The first, **MULSOTEX**, are a group of odors designed to form uniform permanent emulsions when added to Natural Rubber Latex formulations containing an unusual percentage of water.

The second, **TEXAROME**, are a series of highly concentrated odors, recommended for use in formulations not containing a high percentage of water.

Both **MULSOTEX** and **TEXAROME** hold up well under heat, and will not cause coagulation of the base material.

Costs are competitive. More details on request.

Essentially for You



Our 158th Year of Service

**DODGE &
OLCOTT, INC.**

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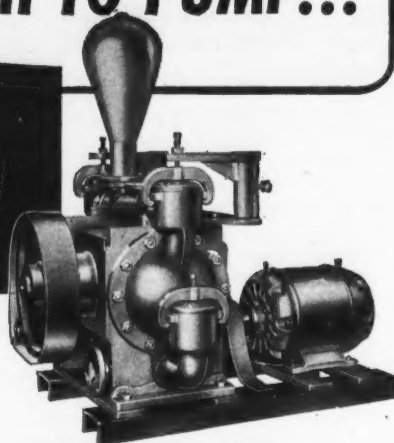
Essential Oils
Aromatic Chemicals
Perfume Bases
Flavor Bases
Dry Soluble Seasonings

When inquiring check 5100
opposite last page

CHEMICAL PROCESSING

IF IT'S TOUGH TO PUMP...

You need a SHRIVER DIAPHRAGM PUMP



for

- ✓ Corrosive
- ✓ Abrasive
- ✓ Viscous
- ✓ Thick • Heavy
- ✓ Delicate
- ✓ Hazardous Materials

Bulletin 137 tells why,

T. SHRIVER & COMPANY, Inc.

Filter Presses • Filter Media • Diaphragm Pumps

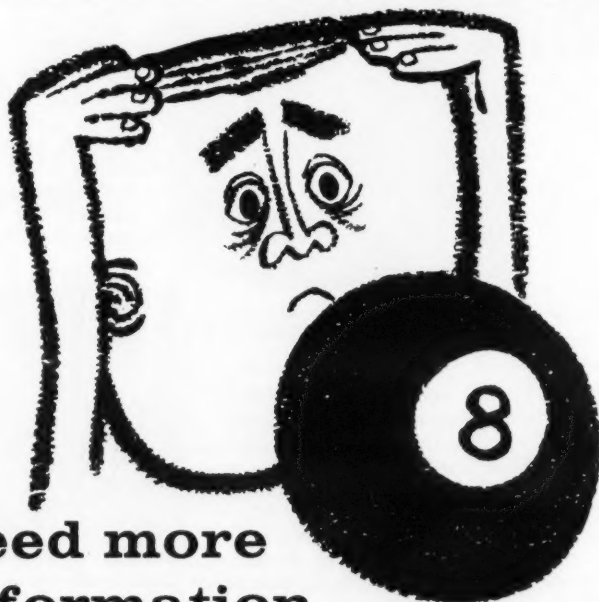
846 Hamilton St., Harrison, N. J.

Sales Representatives in
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San Francisco—Montreal—Toronto

POINTS TO REMEMBER

- No contact between fluid handled and mechanical parts of pump.
- Minimum maintenance cost.
- Parts contacting fluid made of any metal, rubber or synthetic resin lined.
- No packings, hence no leakage.
- Easy to inspect and clean.
- Ample pressure; wide capacity range.

When inquiring check 5101 opposite last page



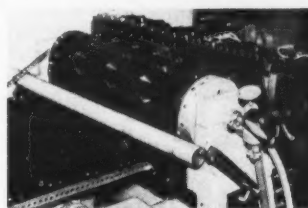
need more information...

Note there is a key number at the end of editorial articles or advertisements. To request more information check the proper number on the convenient form opposite the last page. Send the form to us... we do the rest. Information comes direct to you. No obligation, of course.

IDEAS

Vacuum forming method produces low-cost sheet plastic

Low-cost plastic sheet is being made by new continuous method of vacuum forming. Process involves taking sheet directly from extruder and, while still warm and soft, passing it over vacuum roll where it is formed in desired pattern. Styrene, poly-

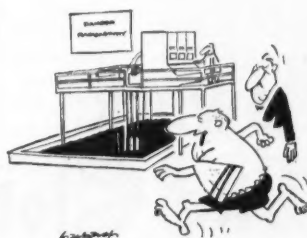


Process produces formed plastic sheets 24" wide

ethylene, acetate and butyrate are being formed by this method. Other materials can also be used.

Process was originally developed to furnish an extended wetted deck surface for air-conditioning and refrigeration industry. Present equipment makes sheets 24" wide in continuous lengths, with thickness varying from 0.008" to over 0.080". Formed sheet may be any color, transparent, or translucent.

(Vacuum forming process was developed by Quick Plastics, Dept. CP, 1732 Cooper St., Jackson, Mich. . . . or for more information check 5102 on form which is located opposite last page.)



"Last one in's a big chowder head."

no one coat does it...



one source does

**Valdura offers maintenance
paints made from specific
resins for every condition**

EPON

VAL-CHEM. Versatile, chemical resistant metal primer for use under any finish coat. **VALPON ENAMEL.** Prevents damage by oils, solvents, alkalies and other chemicals on wood, metal or masonry.

PARLON

PARAVAL ENAMEL. Not affected by acids, alkalies and other chemicals. Used on wood, metal, concrete or masonry. **RUBBER BASE ENAMEL.** Combines excellent exterior durability with high chemical resistance.

BAKELITE

SUPER SERVICE ENAMEL. Resists chemical, moisture and abrasive conditions on metal wood or masonry. **ASPHALT ALUMINUM PAINT.** 98% waterproof metal coat prevents rust, rot, corrosion. Highest reflectivity.

COAL TAR

SEWAGE DISPOSAL BLACKS. Used for protecting concrete and metal surfaces from water, etc., found in sewage plants, reclamation projects, refrigeration systems, metal and concrete pipe, marine exposures.

URETHANE

URAVAL. The very latest type of coating that combines the ultimate in resistance to chemicals, solvents, marbling and abrasion. Uraval will stand up where all other types of coating have failed.

ALKYD

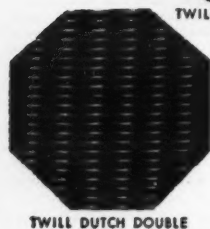
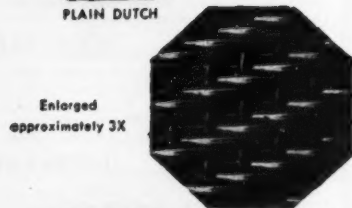
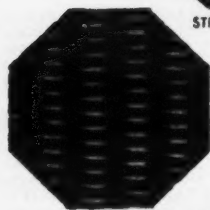
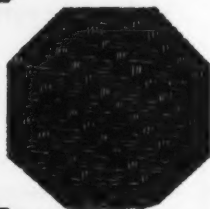
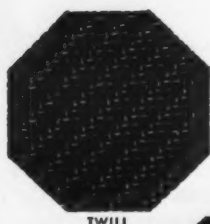
M & F ENAMEL (General Maintenance), **VALKOTE** (Implement Enamel), **DARYWHITE.** Products that utilize the outstanding durability of alkyd resins. All these coatings are hard, tough, quick drying and color retentive.

Write today on your regular letterhead for FREE catalog on all Valdura maintenance paints.

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AMERICAN-MARIETTA CO.
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When inquiring check 5103
opposite last page

Newark Metallic Filter Cloth...



NEWARK
for ACCURACY

Newark
Wire Cloth
COMPANY

351 VERONA AVENUE • NEWARK 4, NEW JERSEY

When inquiring check 5104 opposite last page

Newark Metallic Filter Cloth does stop solids — the wedge-shaped openings allow only the filtrate to pass through. And, Newark Cloth is reversible, both sides being identical. Newark Metallic Filter Cloth is woven firmly and uniformly without loose wires, guaranteeing good filtration all over.

Newark Metallic Filter Cloth is available in a variety of weaves in all malleable metals, and is adaptable to practically all types of filters. When writing, please give us details on your process.

Send for our NEW Catalog E.

IDEAS

Auto tire vulcanized with atomic energy

Tests show it wears longer, resists deterioration better

Scientists at B. F. Goodrich have successfully used nuclear energy to vulcanize an automobile tire. Believed to be the first large commercial item ever processed by nuclear radiation, it is also said to be the first basic change in "curing" of rubber products since discovery of vulcanization in 1839. Scientists say that nuclear vulcanized tires will wear longer and resist deterioration better than conventionally vulcanized tires.

Vulcanization was achieved cold, without use of heat, sul-



Tire was vulcanized by rotating it over radioactive fuel elements

fur, or accelerators—standard components of conventional vulcanization processes. Nuclear method resulted in a direct linkage of the carbon atom chains of the rubber molecules. Carbon atom chains are ordinarily linked through sulfur atoms, the weak link in vulcanized rubber, according to specialists. The tire, encased in steel mold, was vulcanized by rotating it over radioactive fuel elements taken from nuclear reactor. Tire was immersed in 17'-deep water-filled tank.

Future commercial scale vulcanization could be done in a shielded cell with radiation supplied by machines or radioactive by-products from nuclear reactors. Development of this and other similar processes would put many radioactive waste materials to practical use and help alleviate disposal problem.

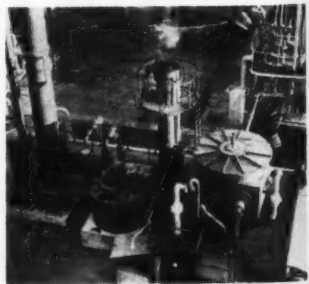
(Information courtesy of B. F. Goodrich Co., Dept. CP, Akron, Ohio.)

LPG reforming process features flexibility, automatic operation

Can turn out 2 million cu ft 472-Btu gas per day

A new versatile process for reforming LPG, refinery gases (including sour gases), and other hydrocarbon feedstocks is being introduced in the US. Designed for use by utility companies for standby, make-up, and special system usage, process has peak capacity of about two million cu ft gas per day. Production industries who want their own high-flame-velocity gas generators to reform LP gas and refinery tails may also find process of interest.

Process is reported to be particularly suitable for waste heat boiler applications. Thermal efficiency is above 78%, even without enrichment (85-



Several commercial installations are operating in France. Generator can be seen in foreground at right

88% with it). Gas produced has heating value ranging up to 472 Btu/cu ft. Specific gravity is 0.5 to 0.63.

280 SERIES METERING VALVES for

precise control

**20 TURNS moves
the stem only 3/8"**



For precision flow control use this brass or stainless steel bar stock metering valve, equipped with an O-ring stem seal. The extra long, sharp, needle point stem (8° included angle) and fine spindle threads insure accurate control for pneumatic or hydraulic service, or precision laboratory work. In 1/4" and 1/2" pipe sizes. Your choice of 1/16" or 1/8" orifices. Available for Panel Mounting, too. For complete information send for Bulletin No. BSV 256.

Visit us at Booth 1316 ISA Show,
Cleveland Auditorium Sept. 9 to 13



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INCORPORATED**

Fluid Control Specialists
145 S. DEAN STREET, ENGLEWOOD, N. J.

When inquiring check 5105 opposite last page

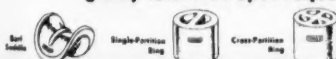


**Save Time
and Money on**

KNOX Tower Packings
for Initial Installations as well as
Replacements, because

- Uniform Quality
- Zero Porosity
- Iron Free
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- High Strength
- KNOX produces porcelain Tower Packings from same composition as is used for High Voltage Electrical Porcelain

Further information, prices and samples
gladly furnished upon request.



KNOX PORCELAIN CORP.
KNOXVILLE 1, TENNESSEE

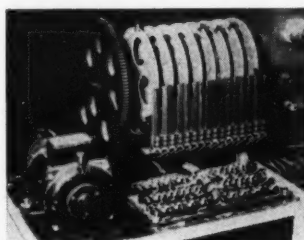
When inquiring check 5106 opposite last page

IDEAS

Known as the MS 17 Micro-Simplex process, it was developed in France. Several commercial installations are operating in that country.

Process uses a nickel-bearing catalyst. Feedstock, air, and steam are injected tangentially through mixer at top of generator. These flow down through generator to produce the resultant gas. Generating cycle is followed by brief period of steam purging after which air and feedstock are supplied for a heating cycle to bring catalytic bed temperature back to proper operating level. Steam purge again ensues before another generating cycle begins.

Process is highly flexible because four different parameters are independently adjustable: 1) cracking temperature during reformation, 2) duration of contact of reacting



A series of 8 commutator-type timing discs actuate contactors to open and close pilot valves for entire cycle

gases in catalytic bed, 3) air-to-feedstock ratio, and 4) steam-to-feedstock ratio. Variation of any one influences characteristics of finished gas.

Control is both by time cycle and pyrometry. A series of 8 commutator-type timing discs actuate contactors to open and close pilot valves for the 4-step cycle. Process is entirely automatic. Control is regulated by thermocouples which are located at selected control points within the catalyst bed.

(Additional information on MS 17 Micro-Simplex process may be obtained from The Gas Machinery Company, Dept. CP, 16102 Waterloo Road, Cleveland 10, Ohio. . . or for more information check 5107 on form which is located opposite last page.)

**Intake
and Exhaust
NOISE**

**Pipe
System
PULSATION**

**Stopped with
BURGESS-MANNING SNUBBERS**

The Burgess-Manning Snubbing Principle has been engineered to effectively eliminate the costly and nerve-racking problem of noise and pulsation. We have, for many years, specialized in the science, cause and effect of noise and pulsation problems. We have adapted the Burgess-Manning Snubbing Principle to many and varied problems in

every branch of industry to increase production, minimize maintenance, eliminate this serious source of compensation claims and improve public and employee relations. Burgess-Manning Snubbers are available with such plus features as: air cleaning—or, spark arresting—or, surge control—or, water separating—or, heat recovery.



**Let us engineer
your noise
and pulsation
problems
right out of
existence.**



Write for
Case Histories.

BURGESS-MANNING COMPANY

Sound Engineering 721 East Park Avenue, Libertyville, Illinois
Dallas, Texas

When inquiring check 5108 opposite last page

STOP LEAKS



Leaks in concrete walls can be stopped quickly with FLEXTITE. Actually seals against water pressure. Efficient as a plaster coat for sealing off water and dampness. Converts wet basements into dry useful space. Used in elevator pits, tunnels, dams, tanks, retaining walls. In reconstruction work, broken pillars and beams can be quickly reshaped with FLEXTITE.

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for FREE TRIAL OFFER**

FLEXTITE

FLEXROCK COMPANY • Offices in Principal Cities
3611-FILBERT STREET, PHILADELPHIA 1, PA.

Please send me complete FLEXTITE information and details of TRIAL ORDER PLAN—no obligation.

Name
Company
Address

When inquiring check 5109 opposite last page

Magnetic ideas from **ERIEZ**

ATTRACTIVE UNDERWATER ATTRACTION! This attractive Miss is demonstrating the Magnetic Power of an Eriez HI-POWR Magnet. This idea of herculean strength (even under water) and permanent dependability is applied in practical ways in industry, where Eriez HI-POWR magnetic separators are used to remove tramp iron from processing lines before it can cause fires, machinery damage or product contamination. Eriez HI-POWR Magnets are also used to convey, control and hold metals, from small parts to large steel sheets and pipe. They are easily installed on new or existing equipment, and offer many automated materials handling advantages. All Eriez Magnets are non-electric, self-contained. They operate without any wires or attachments; magnetic power is guaranteed forever. The first cost is the only cost.



PIPELINE TRAP REMOVES IRON CONTAMINANTS FROM SLURRY! An Eriez Model B Ferrotrap (Pipeline trap) in use at B. T. Babbitt, Inc., Albany, New York, is trapping about 10 lbs. a month of tramp iron and scale. The unit is installed in a tank car unloading line which handles Alkyl-Aryl-Sulfonate slurry, a substance used in the manufacture of the company's product—Babbitt Built Detergent. The trap performs a dual function: it protects equipment from ferrous damage and results in better quality control. Model B Ferrotrap has a stainless steel casing, with threaded fittings to 2", 3" or 4" pipelines. Attached to the removable cover of the unit are multiple stainless steel rods with a lifetime-powered Alnico V magnet within each rod. These rods break up the flow of liquid into finer flows, which pass around the rods depositing iron or iron fines on the magnetic elements. This new design trap offers up to 400% more magnetic area than previous traps and can be installed in any position. Model B provides the ultimate in protection against ferrous contamination of liquids flowing through lines and is also available in a sanitary model for lines handling foods, beverages, drugs, etc.



Eriez HI-VI electro-permanent magnetic vibratory equipment

Here's the first complete line of electro-permanent magnetic vibratory equipment that operates at 3600 CPM directly off an AC line. Just plug the units in—no rectifier needed! Eriez HI-VI units provide greater vibratory output with less power consumption. Less maintenance; lower installation costs. Lifetime-powered Alnico V magnetic element produces exclusive "double action" drive for greater productivity.

HI-VI Vibratory Feeders

convey, spread, agitate, cool, blend, mix, etc. Give an accurate, controlled feed to bulk materials.



HI-VI Unit (Bin) Vibrators



self-adjusting units keep bulk materials pouring evenly and smoothly through hoppers, bins, chutes, ducts, etc. Eliminate pile-ups, bridging, sticking, etc.



PIPELINE TRAP FINDS FINES IN PAINT LINES.

At the Rinshed-Mason Co., Detroit, Mich., an Eriez Model L Ferrotrap (Pipeline trap) is used to protect automotive paints from ferrous contamination. The permanent-powered Ferrotrap is located directly at the outlet of a paint grinding mill where it traps minute particles of steel chipped off the grinding balls. Sometimes these chips are only a few thousandths of an inch in size, but the powerful action of the Alnico V magnetic element traps and holds them until the accumulated iron is removed. The Model L Ferrotrap consists of a long magnetic element, in an all-bronze housing with two openings in the upper side for attachment to pipelines of 1/2" to 2" diameter. Liquids flowing through the line come into contact with the magnetic bar, and deposit their iron contamination. To clean the unit, one end is unscrewed and the magnetic bar is removed with it and wiped with a rag. Model L provides dependable, economical protection against ferrous contamination.



ERIEZ . . . pioneers and world's largest producer of Permanent Non-Electric Magnetic Equipment for Industry have three major product lines to serve your needs.

HI-POWR MAGNETIC SEPARATORS (like those shown above) to remove unwanted iron from processing lines.

HI-POWR MAGNETIC AUTOMATION UNITS to handle untold materials handling problems . . . convey, transfer, control, elevate, re-position, etc., ferrous materials or parts during many manufacturing processes.

And

HI-VI VIBRATORY EQUIPMENT to move and accurately feed bulk materials. Eriez "Magnetic Ideas" can help you. Eriez' factory-trained field men, backed by Eriez extensive laboratory and engineering know-how, will be happy to study your particular problem, make a plant survey, and offer helpful "Magnetic Ideas."

WRITE FOR BIG NEW COMPREHENSIVE CATALOG OF ERIEZ ENTIRE LINE TODAY . . . state your particular problem and we'll try to assist. Eriez Manufacturing Company, 73V Magnet Drive, Erie, Pa.

For more information on product at left, specify 5110 see information request blank opposite last page.



Process recovers Cl_2 from waste HCl electrolytically

Cells can be overloaded as much as 50%

Process has been introduced by de Nora for recovering chlorine from waste hydrogen chloride. Use of process not only results in the recovery of a valuable by-product, but solves difficult and expensive waste disposal problem.

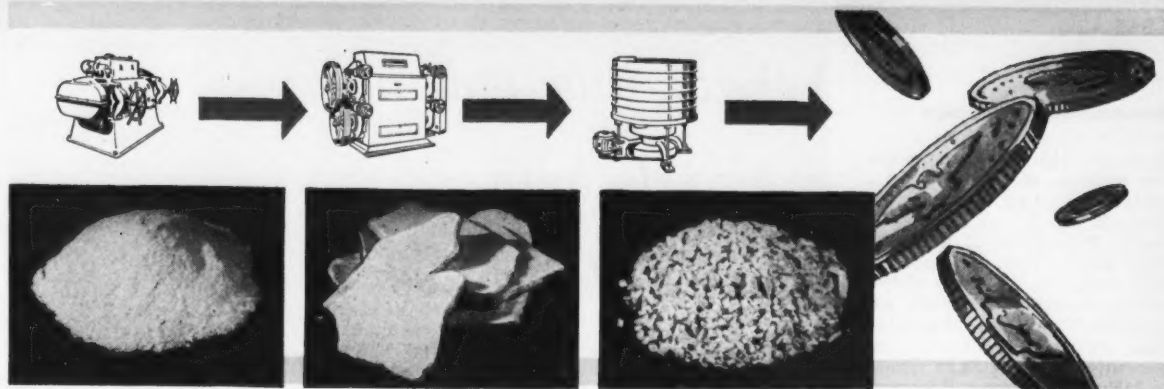
Recovery is carried out by means of electrolysis of muriatic acid. Process is characterized by its high flexibility. Whenever required by an increased demand, the electrolytic cells can be overloaded as much as 50% above rated capacity.

The electrolysis unit, specially designed for HCl , is of the filter-press type. It is composed of a number of single electrolytic cells. These are assembled together between two steel end plates which are clamped against the series of cell frames by means of a capstan screw.

Standard unit is composed of 36 cells. These operate at 1000 amps to produce one metric ton of chlorine per day. Overall dimensions are 17x6 x8' high. Feed input is 76 gal 33% muriatic acid per hr. By-product hydrogen is produced at rate of 11,000 cfd.

Prior to entering cells, the waste HCl gas obtained from the main plant process is passed through a conventional absorption tower, countercurrently to the stream of depleted muriatic acid coming back from the electrolysis process. Muriatic acid leaving absorber contains about 33% HCl and is passed through a cooler in order to give up heat of dilution. Concentrated solution is fed to cells where HCl content is partially decomposed into chlorine and hydrogen. Concentration of outflowing depleted solution is about 18% HCl .

(Information on process for recovering chlorine from waste hydrogen chloride was obtained from Oronzio de Nora Impianti Elettrochimici, Dept. CP, Milano, Italy.)



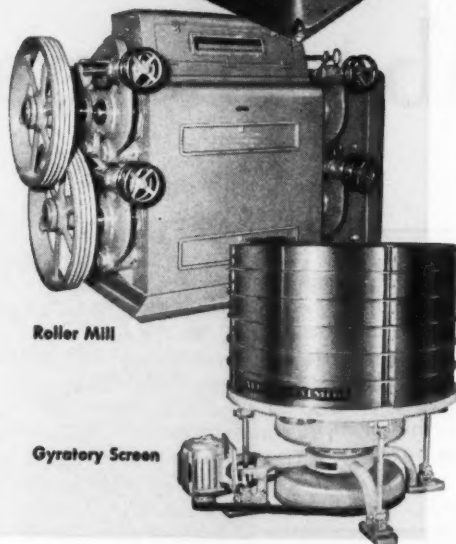
Converts WASTE into PROFIT

ALLIS-CHALMERS

Compacting Process

*it's mechanical
it's economical*

Compacting Mill



Roller Mill

Gyratory Screen

You start with a pile of practically worthless material and wind up with a profit! Magic? Well, hardly — unless you want to call the mechanical efficiency of the Allis-Chalmers Process System magic.

How It Works

In a recent installation the conversion starts with an unusable, unacceptable minus 30 mesh chemical salt... fines created in the original process. An Allis-Chalmers compacting mill densifies these fines into flakes or slabs. Flakes are granulated in an Allis-Chalmers roller mill. Final separation is made in an Allis-Chalmers stainless steel gyratory screen. Result — 70 to 80% recovery of salable product. What's more — the resulting granules equal or surpass the natural product in every respect.

The entire system is mechanical; therefore, it's more economical than controlled crystal growth.

For More Information

Get the complete story from your A-C representative or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin. Ask for Bulletin 25C6177J.

ALLIS-CHALMERS



A-5345

When inquiring check 5111 opposite last page

IDEAS

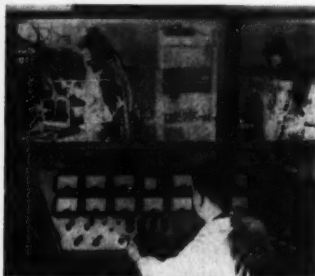
Automation conference

Book of 116 pages contains proceedings of automation conference for executives. Subjects such as management's evaluation of automation, automation and operations research, and role of instrumentation and control are covered. To obtain "Automation — A Conference for Executives" remit \$4.50 direct to MF:AU1, Armour Research Foundation of Illinois Institute of Technology, Dept. CP, 10 W. 35th St., Chicago 16, Illinois.

Plutonium separated by new machine in Britain

In operation at Harwell

First machine in Europe for separating isotopes of plutonium is operating at Britain's atomic research center at Harwell. Known as the



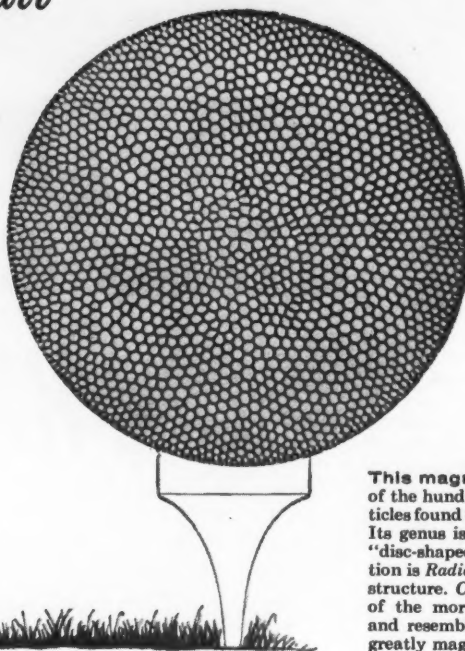
Machine for separating radioactive plutonium isotopes is located in sealed room. Control board is outside of room

"Hermes," the device works on the principle of electromagnetic separation and is capable of separating any number of isotopes with great precision.

Although quantities produced are small (measurable only in thousandths of a gram), the machine is well suited for experimental work. It is flexible and uses considerably less space than equipment needed for diffusion method of separation.

Here's how it works: Plutonium, as plutonium trichloride, is introduced into a vaporizer and heated to 800-900° C by a tantalum wire heater.

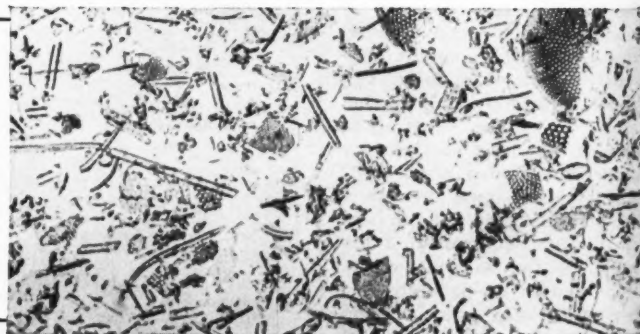
What's this "golf ball" got to do with greater absorptive capacity?



This magnification shows just one of the hundreds of different shaped particles found in Celite diatomaceous earth. Its genus is *Coscinodiscus* which means "disc-shaped sieve." Its species designation is *Radiatus* which refers to its radial structure. *Coscinodiscus Radiatus* is one of the more common marine diatoms and resembles a "golf ball" only when greatly magnified.

It's a particle of CELITE that absorbs more than

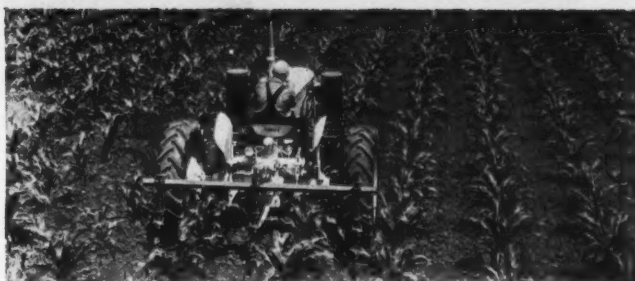
The secret of diatomite's remarkable properties is shown in this photomicrograph. The infinite variety of particle shapes and sizes gives Celite diatomite its exceptional performance characteristics in a wide range of process applications. The large percentage of voids both between and within particles like the "golf ball" provide porosity for high absorption.



Johns-Manville CELITE

CHEMICAL PROCESSING

Helps polishes soak up oil and dirt. In polishes for silver, other metals, glass and airplanes as well as automobiles, Celite absorbs residual oil, dirt and other solid matter. In addition, Celite imparts a delicate non-scratching polishing action.



Provides free-flowing fertilizers for uniform coverage. In ammonium nitrate fertilizers, highly absorbent Celite particles form a protective coating which helps prevent contact between crystal faces... thereby minimizing caking and assuring good flowability.



Controls viscosity in adhesives for corrugated paper. For precise control of viscosity and surface penetration, manufacturers of many types of adhesives rely on Celite's excellent absorptive capacity.

IDEAS

This vaporizes the material and it exists as a mass of molecules in constant thermal motion.

A stream of electrons is then shot into the vapor from above, ionizing the molecules. These positively-charged ions are then accelerated by a 50,000 volt negative potential electrode. Traveling at high speed, the ions pass through a narrow slit and then through another electrode at ground potential. This has the effect of slowing them down and also concentrating them into a narrow band.

Ions next enter a curved tube of stainless steel maintained at 20 millionths of a mm (Hg) vacuum. Radius of tube is 4'. Coils of the electromagnet in whose field tube is situated are actuated by 200 watts. At end of flight there are 4 narrow bands of molecules corresponding to the plutonium isotopes 239, 240, 241, and 242.

Separation between bands is about 1/5", a high degree of resolution, for the heaviest of the 4 weighs just over 1% more than the lightest.

The 4 bands pass through 4 slits into copper boxes cooled by water. Vapor condenses and plutonium is deposited and alloys with the copper. Each plutonium isotope is then recovered from its box by conventional chemical techniques.

(Information above through courtesy of British Information Services, Dept. CP, 45 Rockefeller Plaza, New York 20, N.Y.)

Nuclides chart revised

Second edition of nuclide chart compiled by Dr. W. H. Sullivan of Oak Ridge National Laboratory is now available. The revised chart is organized into six basic classes to present a complete digest of isotope information. Physical data is divided into two categories, pertaining to stable nuclei, and relating to radioactive isotopes. To obtain "The Trilinear Chart of Nuclides", remit \$2.00 direct to Superintendent of Documents, U. S. Government Printing Office, Washington 25, D.C.

-the diatomite mineral filler twice its weight of liquid

Mix 100 cc of water with 100 grams of Celite*... the water is so completely absorbed that the mixture exhibits all the properties of a dry powder. This demonstration is visible proof of the high absorptive capacity of Celite diatomite fillers. Actually it will absorb 2 to 3 times its own weight before reaching its liquid holding limit. The reason is that approximately 93% of a given volume of Celite is composed of air spaces or voids. Despite its highly porous nature, however, Celite does not absorb moisture from the air.

In addition, Celite has many other unique properties which give it wide application as a mineral filler. Its high bulk—a cubic foot weighs only ten pounds—reduces outage in packaged powder products and provides the needed bulking action in many other formulations. The irregular shape of the particles and their hard silica structure adds reinforcing strength to paints and plastics. Other uses include concrete, insecticide diluent, paper and as a source of silica in "water glass" and "lime-silica" insulating materials.

Produced from the world's purest commercially available diatomite deposit, Celite comes in a wide range of grades. Each grade is carefully controlled for complete uniformity.

Ask your nearest J-M Celite engineer to tell you how Celite can help solve your formulation problems. He's backed by Johns-Manville's extensive research facilities and years of practical diatomite experience. Call him today or write Johns-Manville, Box 14, New York 16, New York. In Canada, write Port Credit, Ontario.

*Celite is Johns-Manville's registered trade mark for its diatomaceous silica products.

Industry's most versatile MINERAL FILLER



When inquiring check 5112 opposite last page

Cathodic protection of water-treating equipment
in a chemical plant furnishes —

LOW-COST CORROSION CONTROL WITH MINIMUM DOWNTIME

GORDON WEYERMULLER,
Associate Editor

With **WILLIAM VAN VLIET BACON,**
Chief Material & Inspection Engineer
Westvaco Chlor-Alkali Div.,
Food Machinery & Chemical
Corporation
South Charleston, West Virginia

Problem: Water-purification equipment, installed at Westvaco in October 1953, had a considerable amount of submerged steel to be protected from corrosion.

Equipment consists of two Accelator® water-treatment units and a chemical-holding tank with mixer and chlorine diffuser. Ferric sulfate and chlorine are added to water in the 3000-gal tank. This stream is then proportioned continuously to raw water in the Accelator units. Each unit holds 67,600 gal.

Raw water from Kanawha River is introduced into the agitated center section of each Accelator unit and mixed therein with the chemicals and previously flocculated impurities. Clear



CP Staff Photo

Chemical tank, with mixer, is at lower right. Note aluminum anodes (arrow). Accelator units are behind Mr. Bacon. Van is a corrosion engineer of high standing having been active in this field for a number of years. He is a charter member of the Chemical Group of the Sea Horse Institute of International Nickel and a member of the ASTM and AIChE. Van received his BS degree in Chemical Engineering from Princeton University



CP Staff Photo

William Van Vliet Bacon, Westvaco's corrosion expert, checks current being supplied to Accelator Unit No. 1

water then separates from the mixture in the outer area and is decanted while the floc returns to the center section. Excess floc is concentrated and withdrawn. Purified water is filtered and stored. A portion of the stream used for boiler feedwater passes through water softener and then to feedwater heaters.

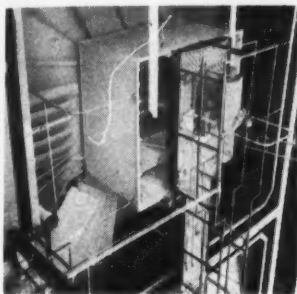
Complex shapes in water treating vessels made adequate main-

tenance of steel difficult, particularly if conventional methods of protection were to be used. Each Accelator unit has 3000 sq ft of exposed surface, 200 sq ft on moving parts.

Solution: After considering cost of various methods of corrosion control, cathodic protection was decided upon as most economical procedure. No. 17ST4 aluminum anodes were installed in des-

ignated locations both horizontally and vertically. A 12½ amp, 34-volt rectifier was used for each of the three vessels. A potential profile — an electrical measurement of protective effect — was made on each vessel.

After initial installation current was raised to present 2.5 to 3 amp level to assure adequate protection to chlorine diffuser. Potentials measured on submerged surfaces vary



Interior view of the Accelator water-treating unit

from -0.800 to -1.900 volts, assuring adequate protection.

Results: Water treating equipment shows no visible evidence of corrosion after being cathodically protected for more than three years. Original cost of cathodic-protection installation was less than that of an alternate method being considered. Only four hours downtime is required on cathodic protection system to change all of the anodes. This is done once per year.

(Cathodic protection system was designed and installed by Electro Rust-Proofing Corp., Dept. CP, 30 Main St., Belleville 9, N.J. Check 5113 opposite last page.)

(For further information on Accelator treatment plants contact Inflico Incorporated, Dept. CP, P.O. Box 5033, Tucson, Arizona. Check 5114.)

Coating formulations

Suggested formulations of epoxy/liquid polymer coatings are listed in eight-page bulletin. Liquid Polymer Coatings Bul — Thiokol Chemical Corp., Dept. CP, 780 N. Clinton Ave., Trenton 7, N.J. Check 5115.



Where you encounter acids, salt and alkaline solutions, sea water, brine or other corrosive fluids, vapors or gases, you'll want Jenkins Ni-Resist Type 2 Cast Iron Gate Valves with type 316 stainless steel trim. They have a remarkable ability to withstand destructive corrosion and erosion.

In paper mill service, food processing, petroleum refining, chemical plants and other process industries, Jenkins combination of Ni-Resist type 2 cast iron and type 316 stainless steel, plus Jenkins extra value construction throughout greatly extends valve life.

Designed especially for corrosive services, the Jenkins Ni-Resist line of gate valves also has superior metal-to-metal wearing qualities. Copper-free, they will not discolor or contaminate products being carried in the line. Let the famous Jenkins Diamond be your guide when choosing Ni-Resist valves . . . it means longer, trouble-free service.

for
longer
valve life

in a variety of
corrosive services

JENKINS NI-RESIST GATE VALVES

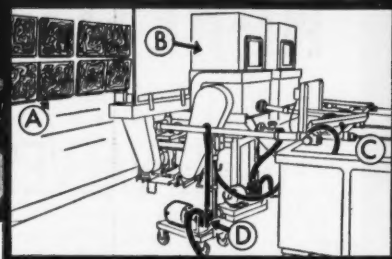
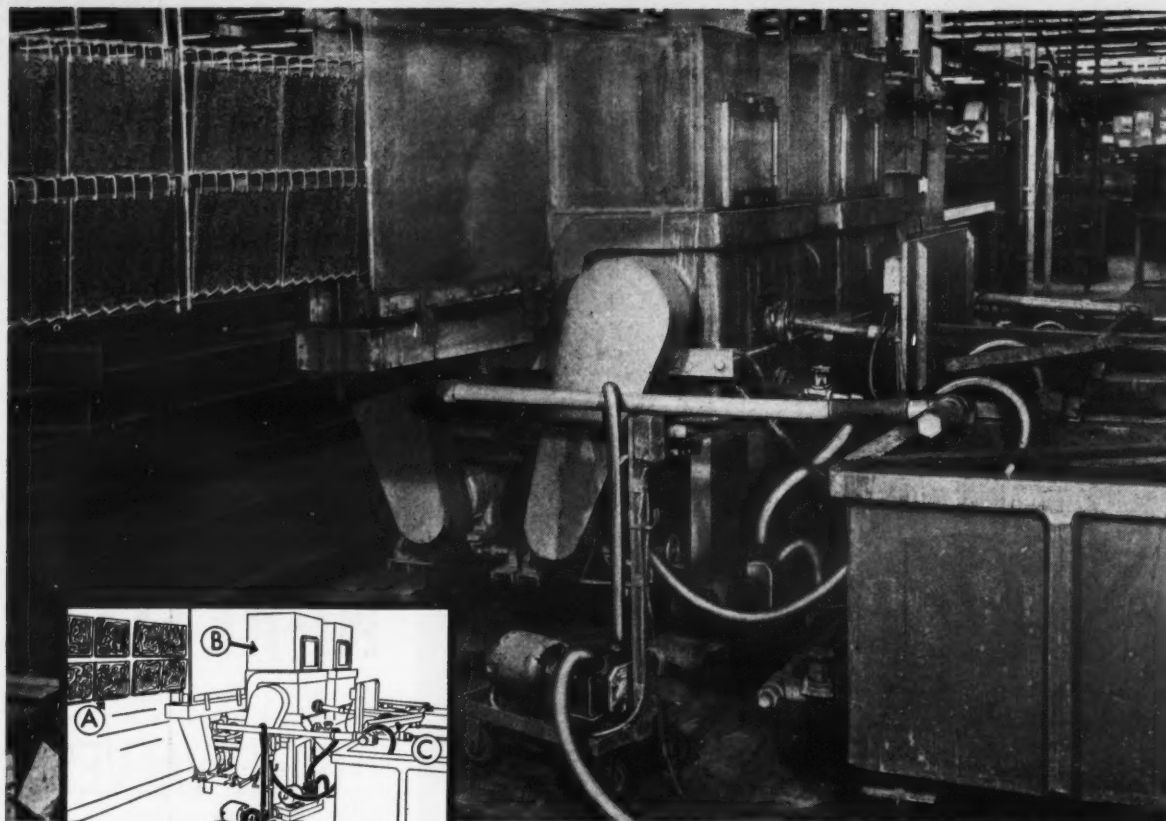
GET COMPLETE INFORMATION

from your Jenkins Distributor, or write
Jenkins Bros., 100 Park Avenue, New
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JENKINS
LOOK FOR THE JENKINS DIAMOND
VALVES
SINCE 1888

Sold Through Leading Industrial Distributors Everywhere

When inquiring check 5116 opposite last page



GRUELING SERVICE: Vanton sealless pumps pump conc. FeCl_3 from reservoir (right) to spray-etch chambers (left) in 12-hr.-per-day continuous operation.

at WESTINGHOUSE's TV-Radio plant in Metuchen, N. J.

3 Vanton Sealless Pumps minimize maintenance problems in pumping ferric chloride for printed-circuit etching

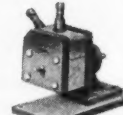
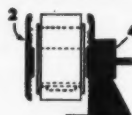
PRINTED-CIRCUIT PROCESS—Copper foil laminated to baseboard has circuit diagram silk-screened with acid-resistant ink (A). Conveyed into etching equipment (B), excess copper foil not covered by resist ink is etched away by warm conc. FeCl_3 . Later, vapor degreaser removes acid-resistant ink, exposing remaining copper circuit.

PUMPING PROBLEM— FeCl_3 is pumped continuously from reservoirs (C) (overflow return), to provide fresh liquor for spray-etch chambers. Before Vanton came on job, high corrosiveness of FeCl_3 and abrasiveness of crystals caused much trouble with conventional pumps. Leakage at packing caused crystallization, with abrasion and scoring of pumpshafts, and expense and nuisance of increased maintenance.

VANTON SOLUTION—When Westinghouse changed to Vanton sealless pumps, these packing problems ceased. Each of 2 etch chambers has its own Vanton pump delivering FeCl_3 from its reservoir. Third Vanton pump (D, foreground) is movable auxiliary, used for cleanout of etch-spray chambers and reservoirs when FeCl_3 batch is exhausted. Vanton plastic materials of construction eliminated the problem of corrosion. A bakelite body block and natural rubber flex-i-liner proved completely impervious to the FeCl_3 . Maintenance was reduced to the infrequent and simple replacement of the inexpensive flex-i-liner.

HOW VANTON PUMP WORKS • Liquid flows in channel between molded plastic body and synthetic flex-i-liner (1). No liquid touches metal. Liner flanges secured to plastic body block by bolted face plates (2). • Pumping mechanism is rotor mounted on eccentric shaft (3). At each revolution it pushes liner against body block and sweeps a "slug" of liquid around the

circular track from inlet to outlet. • All bearings are outside of fluid area and located within protective stainless steel assembly in the event of flex-i-liner failure (4). • Liners are replaced in minutes, with pump in place, by simply removing face bolts and face plate, slipping old liner out, new one in (5).



CHECK THESE VANTON SEALLESS PUMP ADVANTAGES!

- No stuffing box or mechanical seal to leak, contaminate, or require maintenance.
- Self priming; high vacuum.
- A full-time production tool.
- Broad capacity range, $\frac{1}{2}$ -20 GPM.
- Available in 7 body and 10 flex-i-liner materials, to handle a wide variety of corrosives and abrasives.



VANTON PUMP
and Equipment Corp. • Hillside, N. J.

DIVISION OF COOPER ALLOY CORP.

SEND COUPON FOR FACTS!

Vanton Pump & Eqp. Corp., Hillside, N. J. Dept. CPH

My pumping problem is.....

NAME.....

TITLE.....

COMPANY.....

ADDRESS.....

CITY.....STATE.....

CORROSION

Low-cost chemical storage with PVC tank liner

Uses: For storage of such chemicals as phosphoric acid, hydrochloric acid, ammonium nitrate solutions, potassium chloride solutions, and similar corrosive liquids.

Features: Costs of tank and liner are from 20 to 35% of other types of line vessels.

Description: PVC is electrically welded to form leakproof bag which is suspended inside of tank. Corrosion-resistant leakproof fitting acts as inlet, outlet, and sight-gage opening. Chemical resistance is attained between -20° and 120°F.

(PVC tank liner is manufactured by Fabricated Metals, Inc., Dept. CP, San Leandro, Calif. Check 5117A on form opposite last page.)

Insulation cuts cost of butane storage, less space used

Effective anti-corrosion jacket lowers steel requirements

Cellular glass-block insulation, installed with proper mastic and reinforcing membrane, forms an effective barrier against moisture penetra-



Spheroid's glass block insulation resists moisture penetration and prevents corrosion

tion and weakening corrosion of butane storage spheroids at Gulf Oil Corp.'s Cleves, Ohio, refinery, near Cincinnati. Inorganic closed cell structure of block has permanent resistance to moisture.

More than 16,000 sq ft of two-inch thick material was used on two 40,000-barrel tanks. Because insulation

When inquiring check 5117 opposite last page

maintains product at 50°F, a pressure of 10 psi is sufficient to hold it in liquid state. Storage of liquid rather than gas requires less space and lighter, less expensive steel.

Blocks were buttered on edges with mastic, impaled on brads, and pressed firmly into prime coat of asphalt cut-back. Joints and clips were pointed and a coat of cut-back sprayed over entire surface. A 36-inch wide reinforcing membrane, lapped three inches, was imbedded into asphalt, and a third cut-back coat sprayed over entire structure.

(Foamglas insulation is a product of Pittsburgh Corning Corp., Dept. CP, One Gateway Center, Pittsburgh 22, Pa. Check 5118 opposite last page.)

Corrosive fumes removed by air-wash system

Four-page publication describes and illustrates an acid-proof air-wash system for removing corrosive fumes from exit gases. Unit involves bringing gas to be scrubbed into contact with liquid. Raschig rings or saddle packings are employed.

W. J. Beringer has been appointed Manager of the recently formed Process Equipment Division, which will handle the air washer offered by manufacturer. Bul 256—Automotive Rubber Co., Dept. CP, 12550 Beech Rd. at P.M.R.R. Check 5119.



"When are you gonna learn how to use a barrel sling?"

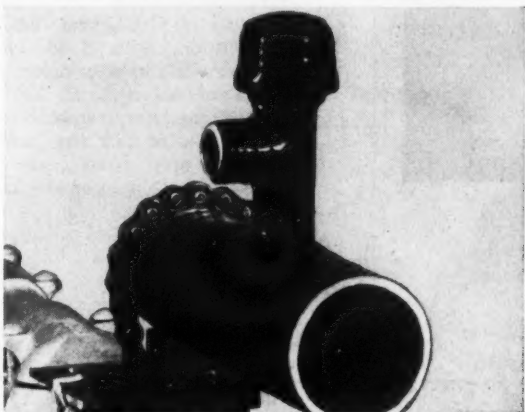
One of these three is the tape coating for you



Polyken No. 900—12 mils, the original all-inclusive tape coating for straight-run applications.



Polyken No. 920—20 mils, thick and tough for heavy-duty use on straight runs, yet it's conformable, too.



Polyken No. 940—12 mils, just the right balance between elasticity and super-conformability for use on irregular pipe structures.

Only if you use a *Polyken* polyethylene tape on accessory jobs are you getting the most for your money

Whatever your need in accessory tape coatings, you will find a *better* solution at *lower* cost with one of these Polyken tapes.

Top corrosion fighter

Why Polyken? Because only Polyken has successfully developed the complete line of polyethylene tape coatings. And no other tape coating—*absolutely none*—can match the remarkable properties of Polyken polyethylene:

- tough and elastic
- unplasticized, non-drying film
- doubly thick adhesive to seal all voids
- far higher adhesion for a true bond to pipe surface
- lower water vapor transmission rate
- higher electrical insulation resistance
- better cold weather handling and durability

Compare the cost of each Polyken tape with that of the competitive tape it surpasses. See for yourself on your next purchase order.

Here is your Polyken Distributor... Contact him now.

Atlanta, Georgia: Anti-Corrosion Mfg. Co., Inc.

Chicago, Ill.: Sales Engineering, Inc.

Cincinnati, Ohio: Hare Equipment

Cleveland, Ohio: The Harco Corp.

Des Moines, Ia.: The Donald Corp.

Fort Worth, Texas: Plastic Engineering & Sales Corp.

Harvey, La.: Allen Cathodic Protection Co.

Kansas City, Mo.: Industrial Coating's Engineering Co.

Long Beach, Calif.: Barnes & Delaney

Minneapolis, Minn.: Simcoe Equipment Co.

Oakland, Calif.: Bison Co.

Philadelphia, Pa.: Harold N. Davis Co.

Pittsburgh, Pa.: Royston Laboratories, Inc.

Plainfield, New Jersey: Stuart Steel Protection Corp.

St. Louis, Mo.: Shutt Process Equipment Corp.

San Francisco, Calif.: Aetna Sales Co.

Seattle, Wash.: Farwest Corrosion Control Corp.

Seattle, Wash.: Pacific Water Works Supply Co.

Tulsa, Okla.: William Cluff Corp.

Complete catalog, Sweet's Industrial Construction File, Sec. 31

Polyken®

PROTECTIVE COATINGS

THE KENDALL COMPANY
Polyken Sales Division

When inquiring check 5120 opposite last page

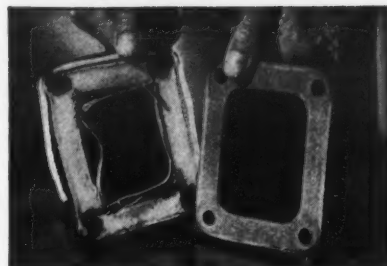
IS NOT ATTACKED BY FUMING NITRIC ACID

Reinforced Teflon (DUROID 5600) showed no sign of attack after 48-hour immersion in Type IIIA fuming nitric acid at 80°F.



DOES NOT COLD FLOW UNDER PRESSURE

Reinforced Teflon (DUROID 5600) at right resisted torque and flange pressure that caused extrusion of Teflon.



REINFORCED TEFLON* (DUROID 5600) INDICATED FOR CRITICAL GASKET USE

GREATER RESISTANCE TO HEAT DISTORTION

Teflon (left) distorted badly when subjected to 720°F. and then cooled. Reinforced Teflon (DUROID 5600) retained flatness.



Rogers makes several grades of reinforced Teflon under the designation DUROID 5600 series. One of these grades may be just the material you need for a critical gasket application. Please write Dept. C for technical data.

*Registered trademark of DuPont Company for its tetrafluoroethylene resin.

ROGERS CORPORATION

ROGERS
CONNECTICUT

DUROIDS • SHOE MATERIALS • ELECTRICAL INSULATION • PLASTICS • RUBBER • FABRICATING • DEVELOPMENT

When inquiring check 5121 opposite last page

CORROSION CONTROL



Ray George, Senior Maintenance Engineer, inspects solution-heat-treated stainless pumps at Westvaco

Solution-heat-treated stainless castings found best for corrosive mother liquor

Problem: Intergranular corrosion caused pump parts, made from stainless steel castings, which were not heat treated, to fail in four to five years at Westvaco Chlor-Alkali Div., Food Machinery & Chemical Corporation, South Charleston, W. Va.

Used on an evaporator, pumps circulated mother liquor containing significant amounts of CaCl_2 and MgCl_2 in solution, with 8 to 10% NaCl crystals in suspension, at a pH of about 6 at 220°F. During the war, replacement parts made of cast iron were good for only three years in this service. Copper and bronze parts failed in 15 months.

Solution: In 1948 a larger evaporator — a 180"-diameter double-effect unit — was installed. Designed by the evaporator manufacturer, two large screw pumps — made from the same type of cast stainless alloy used in the pumps on the previous evaporator — were placed in service to circulate the corrosive mother liquor in the evaporator. This time the castings were given a

solution heat treatment, which consists of heating in the temperature range 2050-2100°F (1½ hr per inch of thickness) and then quenching. Casting quality was controlled by X-rays. Material used for pumps was cast alloy tube type CF-7M (Alloy Casting Institute standard designation), which is essentially 18-8 SS with 0.07 max C and some Mo, corresponding to wrought 316 composition. Screw pumps handle 20,000 gpm at 8' TDH.

Results: Pumps have given no trouble during nine years service. They look as good as new.

(Solution heat treated stainless steel pump castings were furnished by Allegheny Ludlum Steel Corp., Dept. CP, 2020 Oliver Bldg., Pittsburgh 22, Pa. . . or for more information check 5122 on form which is located opposite last page.)

(Screw pumps were manufactured by Zarembo Company, Dept. CP, 170 Franklin St., Buffalo 2, N.Y. Check 5123 on form opposite last page.)

CHEMICAL PROCESSING



Corrosion-resistant coating covers blackest surfaces

Flexes with expansion and contraction of base material

Uses: As protective coating on hard-to-cover surfaces; especially suitable for color keying service lines.

Features: Coating has resistance to sunlight, gases, corrosive fumes, and many solvents. Tough, pigmented plastic film covers blackest surfaces, and flexes with expansion and contraction of base material.

Description: Modified acrylic resin dispersion is combined with selected chemically inert pigments. It will stick to and cover black bituminous



Tough, flexible coating provides protection against corrosion

coatings, concrete, brick, cinder block, porous roofing tile, asbestos shingles, stucco, and properly primed wood and metal. Drying time is approximately 30 minutes. Coating can be applied with conventional spray equipment, brush, or roller.

(Color Coat No 261 is product of Insul-Mastic Corporation of America, Dept. CP, 7750 W. 61st Place, Summit, Ill. . . . or for more information check 5124 which is located opposite last page.)

Totally-enclosed motor

Bulletin of 14 pages covers totally-enclosed motors for chemical and allied industries. Features which permit motors to operate in atmospheres of high humidity or corrosive fumes are explained. Bul 51M 7500-78 — Allis-Chalmers Mfg. Co., Dept. CP, PO Box 512, Milwaukee 1, Wis. Check 5125.



The Mark of *Better Filtration*

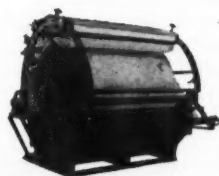
Tear a small piece from the continuous sheet of cake coming from a FEinc String Filter. Turn it over in your hand. In the closely spaced grooves you'll see why FEinc gives better filtration . . . on jobs ranging from thick fibrous cakes to thin sticky slimes.

The strings literally lift the cake out of the weave of the cloth. No scraper to wear, smear or plug the fabric. The cake is dryer, too. Cleaner cloth aids filtrate removal, with less vacuum. No "blow-back" is needed to loosen the cake, hence no filtrate is blown back into the cake. If FEinc's Compression

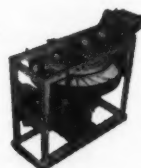
Dewatering Mechanism is added, you get 2 to 6% more moisture out of the cake.

It all adds up to higher yield with FEinc: Cleaner, more workable cake . . . higher recovery of solubles . . . higher filtration rates with a smaller filter . . . extra savings in reduced "down-time" and longer cloth life.

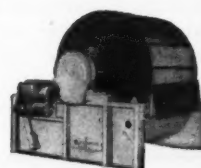
The Original String Discharge Filter is now only one of many types of FEinc continuous rotary vacuum filters available . . . custom-made at standard costs. Write for bulletins today, or ask for performance studies. No obligation, of course.



STRING



HORIZONTAL



SCRAPER

CUSTOM DESIGNED CONTINUOUS FILTRATION

FEinc

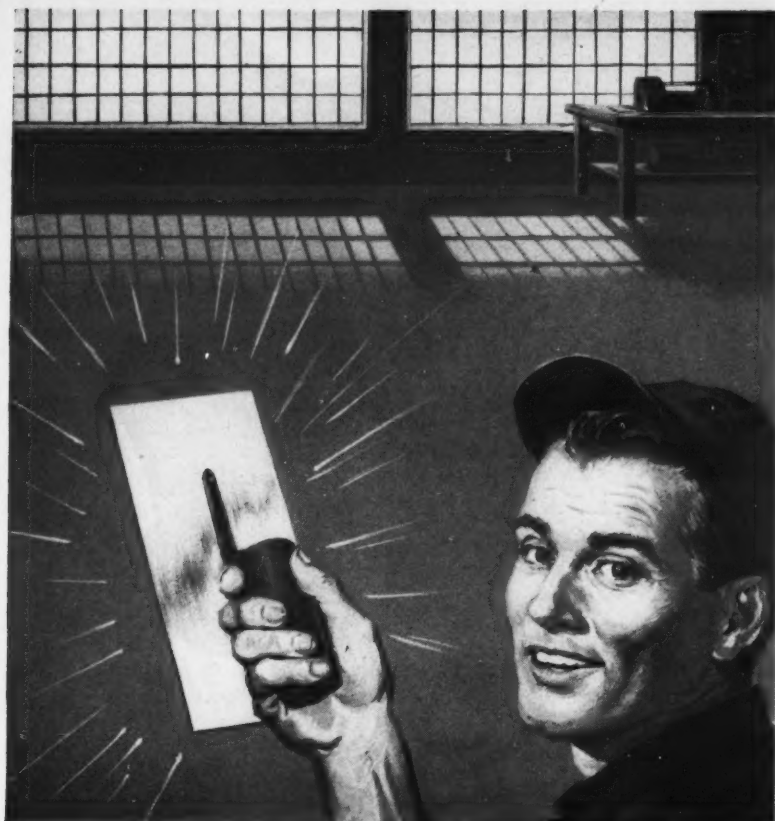
For a
Bigger Yield

FILTRATION ENGINEERS, INC.

A SUBSIDIARY OF AMERICAN MACHINE & METALS, INC.

155 Oraton St., Newark 4, N. J.

When inquiring check 5126 opposite last page



Presto! a new floor in a few hours with **FLINTMASTIC**†

Your trowel is your magic wand!
And the "wonder resurfacing material" that almost overnight can change old worn floors into comfortable, durable, tough surfaces is **FLINTMASTIC**!

Perhaps you need to repair holes or smooth over damaged areas. **FLINTMASTIC** does this kind of work fast and efficiently, too. And **FLINTMASTIC** also fills the bill when it comes to a resilient leveling course as underlayment for decorative floor coverings.

FLINTMASTIC is asphalt mastic flooring made with famous *Flintkote Clay Emulsions* mixed with cement and aggregates. It can be applied over new or old floors... thin or thick. Floors are quiet, comfortable underfoot, shock-absorbing, non-slip, water resistant. They carry the heaviest plant traffic without rutting or cracking.

Do you want complete information for installing **FLINTMASTIC** mixes? Just write us today for specification I-C No. 209.

THE FLINTKOTE COMPANY, Industrial Products Division, 30 Rockefeller Plaza
New York 20, New York

Boston • Chicago Heights • Detroit • Los Angeles • New Orleans • Philadelphia

In Toronto, Ontario: **The Flintkote Company of Canada, Ltd.**

In London, England: **Industrial Asphalts Company, Ltd.**

†A Trademark of The Flintkote Company



FLINTKOTE

When inquiring check 5127 opposite last page

CORROSION

Rubber caulking compound has good adhesion to bare surfaces

Also adheres well to semi-porous surfaces

Uses: As a sealant for curtain-wall construction.

Features: Material has excellent adhesion to clean, bare surfaces. It is also said to adhere well to semi-porous materials such as wood, masonry, and painted surfaces.

Description: Sealant is a two-part Thiokol-based compound. Non-sagging paste may be applied with power equipment, caulking gun, spatula, or putty knife. Flexibility is said to be maintained between temperature ranges of -65 to 225°F. Coating is available in 2½, 10, and 50 lb units. It comes in aluminum, black, brown, gray, and neutral colors.

(Synthacalk is product of Pecora Paint Co., Inc., Dept. CP, 4th St. and Sedgley Ave., Philadelphia, Pa. . . or for more information check 5128 on form opposite last page.)

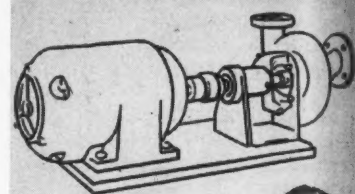
Fluorine polymer coating available as aerosol

Low-cost method for providing corrosion protection

Uses: Fluorine polymer resin coating is suitable for lining tanks and pipes, chemical valve lining, maintenance finishes in chemical atmospheres, and moisture sealing. Small aerosol container provides a means for making tests for possible application to these large items. Also, the small container provides an ideal coating medium for stirring rods and agitators, laboratory containers, aluminum beakers, plastic products, and other objects.

Features: Fluorine polymer coating has excellent chemical resistance to acids, alkalis, salts, and organic solvents. Product is available in aerosol containers for easy, economical spraying. This is believed to be the first thermoplastic resin of its type

Keep "Down-Time" to a Minimum



**CHEMPRO
TEFLON
PACKINGS**

**CHEMPRO
TEFLON
SEAL CAGES**

If you are pumping or processing highly corrosive liquids and slurries, the Chempro Teflon† Packing-Seal Cage combination can drastically cut packing and shaft replacement, and keep your "down time" to a minimum. Pumping operations that formerly required daily repacking now operate continuously for months without repacking.

CHEMPRO TEFLON RING PACKING provides a frictionless, positive seal impervious to chemical attack. Chempro Styles 101 and 201 packing are available in ring sets, solid or split, to fit any pump or process equipment stuffing box.

CHEMPRO TEFLON SEAL CAGES for lubricating or cooling stuffing box packing are machined in a single flexible piece that snaps over the shaft, fitting snugly without vibration. They are non-scoring and corrosion-resistant, and last many times longer than metal lantern rings.

Ordering Information

1. Specify equipment make, model and size
2. Diameter of shaft
3. Bore and depth of stuffing box
4. Number of rings, solid or split
5. Material to be handled

THE ORIGINAL FABRICATORS OF
TEFLON PACKINGS AND GASKETS



9 Broadway, New York 4, N. Y.

When inquiring check 5129
opposite last page

CHEMICAL PROCESSING

CORROSION

adapted successfully to aerosol packaging.

Description: Chemically a polymer of trifluorochloroethylene, the aerosol product offers the same advantages with the small container that could be obtained with large commercial spraying equipment. It is a good way to evaluate the performance of the coating. After the desired thickness of coating is applied, it must be fused in a vented oven at 480°F. Cold water quench completes application.

(Dispensing pressure in aerosol product is provided by Du Pont Freon propellant.)

(Polyfluoron resin spray coating in aerosol containers is available from Acme Resin Corp., Dept. CP, 1401 Circle Ave., Forest Park, Ill. . . . or check 5130 on form opposite last page.)



Cutaway view shows how corrosive liquids are prevented from touching metal in saran lined pipe and fitting.

You can see why saran lined pipe is so corrosion resistant!

It's steel pipe lined with durable saran . . . acids, alkalis can't harm it

Plan zirconium vessels up to 1000 gal

Zirconium kettle of two gal capacity is reported to be first commercially produced vessel of this material. Already considerably advanced in fabrication techniques, manufacturer plans to produce zirconium reaction vessels ranging up to as large as 1000 gal.

(Zirconium kettle is product of The Pfaudler Co., Dept. CP, 1043 West Ave., Rochester, N.Y. . . . or for more information check 5131 on form opposite last page.)

Corrosive liquids won't harm this pipe, its fittings or its valves. A thick, tough saran lining completely protects it from commonly used acids, alkalis, other corrosive liquids.

It's strong, too. Saran lined pipe will withstand working pressures up to 300 psi. Saran lined valves and fittings are available for working pressures of 150 and 300 psi. You can

use the same supports you would use with ordinary steel pipe. Ease of fabrication will keep your installation costs down. Cutting and threading can be readily accomplished in the field with conventional hand tools or power equipment.

For tomorrow's protection, investigate saran lined pipe today. THE DOW CHEMICAL COMPANY, Midland, Michigan.

SARAN LINED PIPE COMPANY
DEPT. SP15918-1
2415 BURDETTE AVENUE
FERNDALE 20, MICHIGAN

Please send me information on saran lined pipe, fittings and valves.

Name _____ Title _____ Company _____
Address _____ City _____ State _____

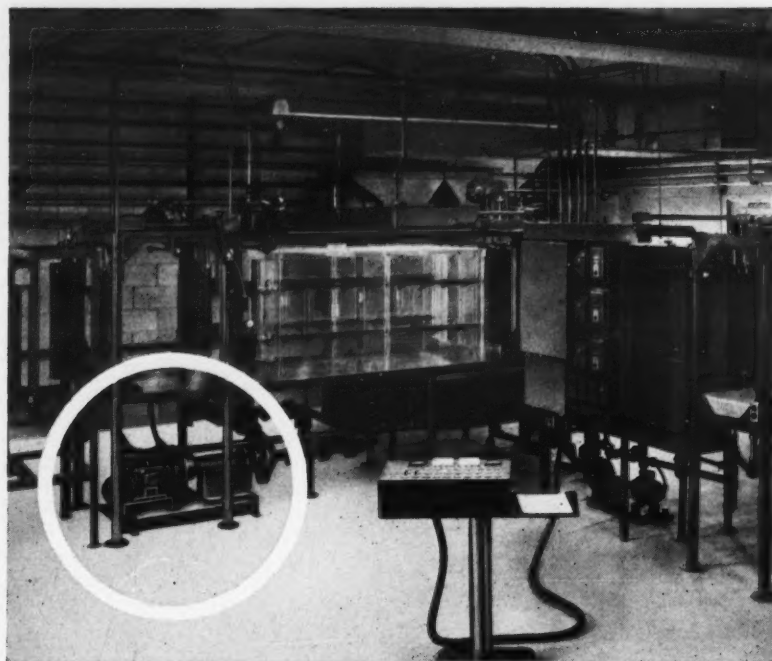
YOU CAN DEPEND ON

DOW

When inquiring check 5132 opposite last page

OLIVITE PUMPS

solve "TOUGH PROBLEM PUMPING"
job at Buckbee Mears Company



Continual transfer of ferric chloride to an etching chamber for acid etching of precision parts was a "problem pumping" job at Buckbee Mears Co., St. Paul, Minn. . . . But the Olivite Acid Handling Pumps installed 3 years ago provided a solution and have continued to provide maintenance free service since going on stream.

The Olivite Pump . . . both hydraulically and chemically, is designed to meet specifications inherent in applications such as at Buckbee Mears. Efficient and durable for handling hot or cold corrosive solutions . . . neoprene or rubber base composition protection for casing, cover and impeller and a floating stuffing box which constantly adjusts itself to the shaft provide maximum protection against corrosion and leakage.

Thousands of Olivite Acid Handling Pumps have been supplied to the Process Industries. The values of design, manufacturing and operating experience accumulated through these installations is embodied in every Olivite Pump sold.

For a free copy of Bulletin No. 5004 covering the Olivite Pump or any of the Dorr-Oliver line of Pumps for the Processing Industries, write Dorr-Oliver Inc., Barry Place, Stamford, Conn.

Olivite T.M. Reg. U.S. Pat. Off.



When inquiring check 5133 opposite last page

CORROSION

Plastisols combine thickness with chemical resistance

F. L. SCOTT and W. C. HOSFORD
Metal & Thermit Corporation
Rahway, New Jersey

One weapon against corrosion that has an important place in the arsenal of the corrosion engineer is vinyl plastisols. These materials consist of dispersions of vinyl resin particles in plasticizers.



A plastisol lining protects this exhaust system from mineral acid fumes

Principal advantage afforded by them is that a protective film thickness of 15 to 20 mils or more can be uniformly applied to a complex surface in one coat. Moreover, this film has excellent resistance to acids and alkalis.

Case histories cited in this technical paper illustrate the value of plastisols for specific applications. One of the first applications for spray plastisols, in contrast to those applied by dipping, was as a lining for the exhaust system for a large electroplating plant.

Here the fumes being removed consist of mixtures of hydrochloric, nitric, and sulfuric acids. In this installation, a two-coat system of plastisol totalling 35 mils was employed. This duct system shows no evidence of deterioration after four years of service.

Plastisols have been used to coat a 5'-diameter, 400-lb bubble tray. This tray, placed at the bottom of a 60' scrubbing tower, supports a packing composed of carbon or ceramic rings.

Gases containing hydrochloric and nitric acid fumes bubble through the packing

Catawissa
PERFECT SEAL
Unions

HOT FORGED from solid, rectangular steel bars, designed and produced for dependable, long-life service under the severest piping conditions!

A TYPE FOR EVERY USE!
FOR ALL PRESSURES!
FOR ALL TEMPERATURES!



Standard & Double Extra Heavy UNIONS

Available with screwed or socket weld ends. 3000-lb. sizes 1/8" to 3"; 6000-lb. sizes 1/8" to 2".



ORIFICE UNIONS

With screwed or socket weld ends. 3000-lb. and 6000-lb. service.

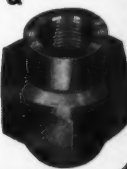
MALE & FEMALE UNIONS

With steel-to-steel, bronze-to-steel, stainless steel-to-steel or orifice seats. 3000-lb. service only.



FULL STAINLESS & FULL ALLOY STEEL UNIONS

With screwed or socket weld ends. 3000-lb. and 8000-lb. service.



WRITE FOR CATALOG 56
showing the complete Catawissa line of Perfect Seal Products

CATAWISSA VALVE AND FITTINGS COMPANY
620 Mill St. • CATAWISSA, PA.

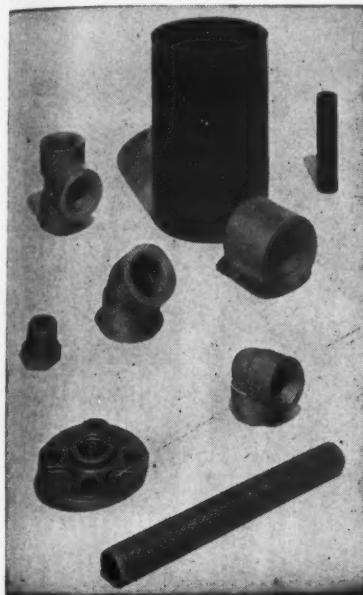
When inquiring check 5134 opposite last page

CHEMICAL PROCESSING

LUZERNE

PVC PIPE & FITTINGS

Will
Help Solve Your
CORROSION PROBLEMS!



Having trouble with corrosion or internal build-up of slime and scale in your piping? The smooth inside surface of LUZERNE rigid, unplasticized Polyvinyl Chloride Pipe and Fittings means less of this difficulty; and because it's non-metallic, electrolytic action is eliminated, too.

LUZERNE PVC Pipe and Fittings are light in weight, easy to install with either screwed fittings or welding socket fittings, and economical. Immediate delivery. Sizes 1/4" to 12". (Large sizes on request.)

SEND FOR BULLETIN PF-1200

LUZERNE offers an improved and expanded line of HARD RUBBER VALVES for Chemical Applications . . . Flanged Valves . . . Threaded Screw Straight Way Valves . . . Screw Stem Angle Valves . . . Globe Valves . . . all with improved Du Pont Teflon packing.



Custom Molding

The LUZERNE RUBBER CO.

200 Muirhead Avenue Trenton, N. J.

Sales Representatives
ALBERT J. COX CO.
Chicago, Ill.

R. C. FOLTZ CO.

Houston, Texas

L. A. RUBBER & ASBESTOS WORKS
Los Angeles, Calif.

When inquiring check 5135
opposite last page

AUGUST 1957

CORROSION

while caustic solutions trickle down, removing and neutralizing the acid fumes. After two years of service, the plastisol-coated bubble tray is still standing up.

For the lining of tanks, recent developments permit plastisol formulations that will build 80 to 100 mills in two spray coats. This added thickness gives good protection from abrasion, particularly on front edge of tanks.

Plastisol linings have also been used for lining centrifugal, cone-shaped cleaners used in the paper industry. Another recent application for plastisols is as a premium lining for drums used for transporting phosphoric acid, detergent concentrates, and acid dyes.

(Condensed from technical paper, "Plastisols Combine Thickness with Chemical Resistance", which was presented at the 1957 Annual Meeting of the National Association of Corrosion Engineers in St. Louis.)

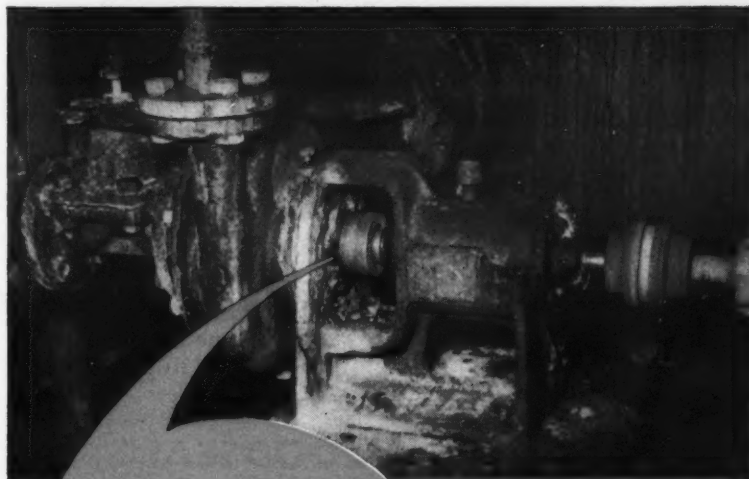
(For further information on plastisols contact Metal & Thermit Corp., Dept. CP, Rahway, N.J. . . . or for more information check 5136 on form opposite last page.)



"The liner's still intact, Chief,
but the walls are awful flabby."

sealing against 95% H₂SO₄
at 70°C. to 90°C. for 15,000 hours
continuous service at 1750 R.P.M.

...a Chemiseal's record at Kolker Chemical Co.



This Chemiseal All-Teflon Mechanical Seal—first of four installed at this plant and all serving with equal satisfaction—was the third type of mechanical seal to be tried for the application, after other makes had quickly failed.

The user's comment is, "No praise is too high for this seal."

What are your shaft sealing problems? Why don't you investigate Chemiseal—the mechanical seal of Chemically Impervious, Pressure-Balanced Teflon Bellows Design. It will pay you in longer, trouble-free life.

Write for Bulletin MS-1155.

**United
States
Gasket**

United States Gasket Company
Camden 1, New Jersey

Plastics Division

OF THE GARLOCK PACKING COMPANY

When inquiring check 5137 opposite last page

GOODALL CLOTHING AND FOOTWEAR . . .

*for Reliable Protection
in Plant and Laboratory*

Goodall Clothing and Footwear meet every plant and laboratory need with items of long-established quality and value. Practical design, selected materials and careful manufacture assure the utmost in protection, comfort and durability.



COATS • APRONS • OVERALLS

Available in rubber, rubber latex and neoprene latex, in a wide range of styles and sizes. Carefully tailored to provide fine appearance, maximum comfort and long wear.



"GOODSEAL"

All-Purpose Gloves

Made of a special compound that is impervious to the actions of oil, acids, alkalis, animal fats and most other solids and solutions. Smooth, flexible, easy to wear. Highly resistant to snagging and puncturing. Extra-grip finish on finger tips.

BOOTS • SHOES • RUBBERS

Rubber and Neoprene Boots, and Lace Work Shoes, with or without "Toe-Saver" (R) Safety Toe. Slip-resistant soles. White Dairy Boots, 10" high. Best quality Work Rubbers, net lined.



"If it's GOODALL, it MUST be GOOD!"

Contact Our Nearest Branch for Details and Prices

Standard of Quality—Since 1870



HOSE • BELTING • FOOTWEAR • CLOTHING
AND OTHER INDUSTRIAL RUBBER PRODUCTS

GOODALL Rubber Company

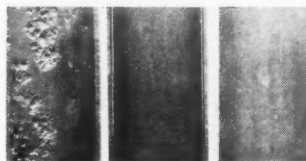
GENERAL OFFICES, MILLS and EXPORT DIVISION, TRENTON, N. J.
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CORROSION

How to control corrosion in coal-chemical plants

C. P. LARRABEE & W. L. MATHAY
Applied Research Laboratory
U. S. Steel Corporation
Monroeville, Pennsylvania

Experience has shown that construction materials for coal-chemical plants must be carefully selected on the basis of pilot-plant and field tests to avoid extensive corrosion losses. Stainless steels such as AISI 304 and 316 have been found to be economically resistant to corrosive attack in primary coolers, ammonia saturators, tar stills, and light-oil equipment — but should only be used when their use is justified by corrosion tests.



Sections of primary-cooler tubes after 28 months exposure in corrosive atmosphere. Galvanized steel is at left, copper-lined steel in center, and 304 stainless at right

For example, at one of the coal-chemical plants of U.S. Steel, service life of galvanized steel tubes in 30 indirect primary coolers was only three to five years in the warmest half of each unit.

Max temp was 160°F. Inside of tubes was exposed to river water treated with lime to raise pH to about 4.5. Severe corrosion occurred on the interior surfaces. Corrosion of exterior tube surfaces, exposed to gases and vapors, was negligible.

Because it was believed that substantial savings could be made by using a more corrosion-resistant metal for the tubes, a corrosion testing program was initiated. Service tests were run on tubes made of 304 stainless (18% Cr, 9% Ni), copper-lined steel, and galvanized steel. Photo shows a center section of each type of tube after 28 months service. Results indicated a service life of 3.5 years for galvanized

for PUMPING CHEMICAL SOLUTIONS!

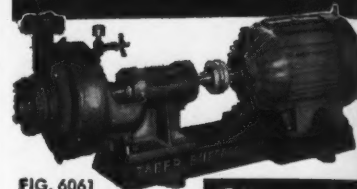


FIG. 6061

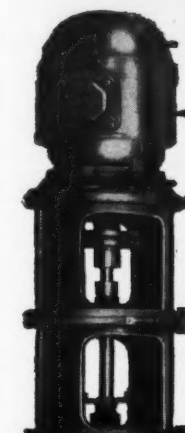


Fig. 19,488

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TABER PUMPS ARE
specially built for
handling chemical solutions, efficiently and economically . . . in the processing industries. The Vertical design permits locating stuffing box above and out of liquid level. Therefore nothing to leak.

BULLETINS
as above gladly sent on request.

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Est. 1859
320 ELM ST.,
BUFFALO 3, N. Y.

TABER

When inquiring check 5139
opposite last page

CHEMICAL PROCESSING

When inquiring check 5138 opposite last page

steel, 12.7 years for copper-lined steel, and an indefinitely long life for 304 stainless. Construction of warmest halves of each primary cooler with 304 is expected to provide substantial savings.

Similar service tests have furnished savings in other processing applications in coal-chemical plants. It has found economical to use copper steel and high-strength, low-alloy steels for outside structural-steel work in many locations. Stainless steel is used for siding and roofing in areas exposed to severest conditions.

When galvanized steel is used for roofs, both sides should be painted. It is important that lapped joints be completely protected by the coating since corrosive chemicals often accumulate there. Stainless steel roofs are usually painted only on interior since rain washes corrosives from outer surface.

Sulfur in moist coal makes it quite corrosive to carbon steel. Steels containing over 12% Cr are satisfactory for coal. Type 410 has been found to be best material for coal bunkers and chutes.

(Condensed from technical paper, "Controlling Corrosion in Coal-chemical Plants," which was presented at 1957 Annual Meeting of the National Association of Corrosion Engineers in St. Louis.)

(For further information on stainless steel for coal-chemical plants contact U.S. Steel Corp., Dept. CP, 525 William Penn Place, Pittsburgh 30, Pennsylvania . . . or for more information on manufacturer's product, check 5140 on convenient Reader Service slip located opposite last page.)

Teflon packings

Specific recommendations as to services, applications, and temperatures for Teflon packings which can be used to handle industrial acid, solvent, corrosive, or alkali are presented in eight-page bulletin. Bul P-325 — Crane Packing Co., Dept. CP, 6400 Oakton St., Morton Grove, Ill. Check 5141.

Hooker cuts valve maintenance costs on chlorine service



Crane chlorine valves have longer service life

The Hooker Electrochemical Co. knows that the hazards of liquid chlorine loading rack service call for valves that can stand the gaff. That's why it selected Crane No. 1654 and No. 1655 flanged end globe and angle valves for its Tacoma, Wash., plant.

Except for infrequent servicing of the packing, these Crane valves have been entirely free of leakage and maintenance since being installed over three years ago.

What gives Crane chlorine valves this extra performance value?

Each part is designed of materials suitable

for the service needs. Carbon steel body has heavy wall sections for safety. Monel stem and Hastelloy "C" seating combination withstand the corrosive effects of chlorine. Narrow bearing 45° taper disc and seat design breaks down hard deposits on seating surfaces, assures positive closure. Teflon stem packing assures tight stuffing box, with easy operation.

If you are handling water-free chlorine gas or liquid in your plant, it will pay you to ask your Crane Representative about the complete line of Crane chlorine valves.



ASK YOUR CRANE MAN for a copy of "Valve Performance Facts"—32 case histories throughout industry. Or write to Crane Co., address below.

CRANE VALVES & FITTINGS

PIPE • PLUMBING • KITCHENS • HEATING • AIR CONDITIONING

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Want to forget about rust for 20 years?



Pure zinc or aluminum, molten-sprayed on iron or steel surfaces, provides positive, dependable protection against atmospheric corrosion for upwards of 20 years without any further maintenance.

These unique coatings are *mechanically* bonded to the surface—adhesion is *not* dependent on volatile vehicles or binders. Scaling, crazing, blisters are eliminated. Protection is *positive*. "Metallize 'em and forget 'em!"

Why not find out more about how you can forget about rust on iron and steel structures and equipment—eliminate the nuisance and expense of constant painting and repainting? Write for descriptive Bulletin 62-B—it's free.

the Metco* Systems

—a series of 18 basic engineering specifications developed over 19 years of experience with pure zinc and aluminum coatings on many different types of structures and equipment in a wide range of corrosive conditions. The *Metco Systems* provide for standardization of surface preparation, coating thicknesses and organic aftercoatings for various surface conditions and appearance requirements.



Interiors of these two steel 15,000 gallon sprinkler tanks were metallized with zinc in 1934 at the General Mills plant in Buffalo. Last inspected in 1950, no trace of rust could be found, and zinc remaining is expected to provide protection for an additional 15 to 20 years.



Metallizing Engineering Co., Inc.

1143 Prospect Ave., Westbury, L. I., New York • cable: METCO
In Great Britain:
METALLIZING EQUIPMENT COMPANY, LTD.—Chobham near Woking, England

DON A. WATSON METALLIZING ENGINEERING CO., INC.

1143 Prospect Ave., Westbury, Long Island, N. Y.

- ☐ Please send me, without obligation, Bulletin 62-B.
☐ Please have Metco Field Engineer call.

NAME _____

COMPANY _____

STREET _____

CITY _____

ZONE _____

STATE _____

When inquiring check 5143 opposite last page

CORROSION

Cutting oils withstood by urethane coating

Lasts several times as long as previous coating

Problem: Only about one month's service was obtained from coatings used on machine tools and the beds beneath them used to catch cutting oils and metal shavings. This was occurring at a large aviation company in the Midwest. Coating was needed that could withstand the corrosive action of the cutting oils and the abrasive action of the metal shavings.



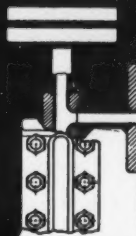
Left panels were subjected to butyl acetate and glacial acetic acid. Panels next to left were treated with methyl ethyl ketone and 70% sulfuric acid. Panels third from left were treated with toluol and concentrated HCl. Panels at right were subjected to carbon tetrachloride and 50 percent NaOH

Solution: Several months ago plant started using a new type of coating recently introduced to this country, which is based on urethanes. This coating is made by combining a chemical containing an isocyanate radical with a polyester. Coating comes in two parts, which are mixed shortly before using. Only air drying is required.

Cured urethane film pos-

How to Handle and Gage Corrosive Liquids

safely and accurately



You can handle and gage acids and other corrosive liquids *safely and accurately* with Jerguson Lined Gages. Corrosive materials can't harm these gages . . . for they are lined with natural and synthetic rubbers, lead, phenolic base compounds, Teflon, etc., or are made with chambers of Havg, Saran or various metal alloys . . . depending on your individual need.

Jerguson has a complete line of gages, valves and specialties for use in the observation of liquids and levels in the Chemical and Petrochemical Fields. Lined Gages are available in both reflex and transparent types . . . in a wide variety of connections and hook-ups.

Send for Drawing GD-431 . . . or send us your requirements.

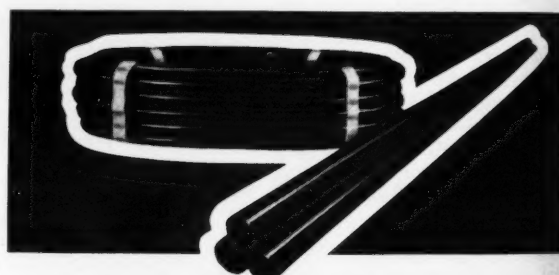
Gages and Valves for the Observation of Liquids and Levels

JERGUSON

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100 Adams Street, Burlington, Mass.

Offices in Major Cities. In Canada: Peacock Bros. Ltd.
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When inquiring check 5144 opposite last page



For Economical, Corrosion-Resistant Fluid-handling Systems, Specify REPUBLIC PLASTIC PIPE

Republic Plastic Pipe is available in three proven types. Each offers economy, plus corrosion-resistance, in a variety of applications.

● **Republic FE** (Flexible Polyethylene) Provides flexibility and mobility. Comes coiled from ½- to 3-inch diameters; straight lengths to 6-inch diameters.

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● **Republic SRK** (Semi-Rigid Kralastic) Strength and toughness shrug off physical abuse. SRK also provides excellent chemical resistance. Available only in straight lengths, from ½- to 6-inch diameters.

All types are light, easy to cut and join, immune to electrolytic action. Write for complete data on economical, corrosion-resistant Republic Plastic Pipe Products.

REPUBLIC STEEL

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CHEMICAL PROCESSING

Threaded Specialties

lower cost TEE BOLTS by an exclusive method

Among Pawtucket's many specialty products are these lower-cost tee-head bolts. Pawtucket's exclusive production method keeps cost low, dimensional accuracy unusually high and strength above standard. Pawtucket tee head bolts are made in standard sizes 1/4" and larger, or to your specifications. In any size, you can depend on a uniform Class 3 fit, if required.

All standard steels, stainless steels and non-ferrous metals, including Titanium



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MANUFACTURING COMPANY



327 Pine Street
Pawtucket,
Rhode Island

When inquiring check 5146
opposite last page

CORROSION

sesses solvent resistance that is said to exceed any other air-drying organic coating used today. It is not affected by aromatic hydrocarbons and has excellent resistance to ketones and acetates.

Urethane coating has outstanding surface hardness, mar resistance, and impact strength. Resistance to alkalis and acids is good, with exception of strong oxidizing acids such as nitric.

Following is typical formulation for coating of the type used at the plant:

Material	Parts by Wt
Multron R-4	7.2
Multron R-22	7.2
Flow agent	3.0
Titanium dioxide	19.8
Lampblack	0.4
Lecithin, 50%	0.2
Antiflooding agent	0.1
Solvent	42.1
	80.0
Mondur	20.0
	100.0

At the aviation plant two coats of primer were used with one top coat for a final film thickness of five to six mils. Coating is gray in color, and was applied by spray.

Results: Urethane coating has lasted five or six months so far in the cutting oil application — compared to the one month service of previous coating. Resistance to solvents and abrasion shown by this application suggests that the urethane coating could be used to advantage in chemical processing applications where solvent resistance is of prime importance.

(Multron R-4, Multron R-22, and Mondur CB urethane materials are products of Mobay Chemical Co., Dept. CP, St. Louis 4, Mo. . . or check 5147 on the convenient Reader Service slip which is located opposite last page.)

(Urethane coating is product of Valdura Div., American-Marietta Co., Dept. CP, 101 E. Ontario St., Chicago 11, Illinois . . . or for more information check 5148 on form opposite last page.)

TWO SUPERIOR SHEET PACKINGS

for all chemicals Belmont **TEFLON***

Inert to all chemicals (excepting molten alkali metals and fluorine at elevated temperatures).

Available in sheet thicknesses from 1/2" up, and in sheet sizes from 24" by 24" to 48" by 48". Tape is available in continuous rolls in thicknesses from .005 up and in widths up to 12 inches.

Cut gaskets to specification and envelope gaskets with compressible filler materials for all standard pipe flanges. Write for catalog T-57.

*du Pont Trademark

for oils and solvents Belmont **NEOPRENE**

ask your BELMONT Distributor

Such leading Packing Distributors as:
HIN & Industrial Supplies, Inc.
in Louisville
and
Sterling Rubber Products Co.
in Dayton
are ready to serve you promptly and helpfully, wherever you are.

Belmont Neoprene sheet packing has high resistance to petroleum products, alcohol, caustics and many acids. It has high tensile strength and has good abrasion resistance.

Available in standard rolls, 40" wide by 10 yards long, in thicknesses from 1/2" to 1/4" inc. and in durometer hardness of 40, 50, 60, 70, 80 and 90. Also available in cut gaskets.

Write for Catalog 56.
The Belmont Packing & Rubber Co.
Butler & Sepviva Sts.,
Phila. 37, Pa.

BELMONT

When inquiring check 5149 opposite last page



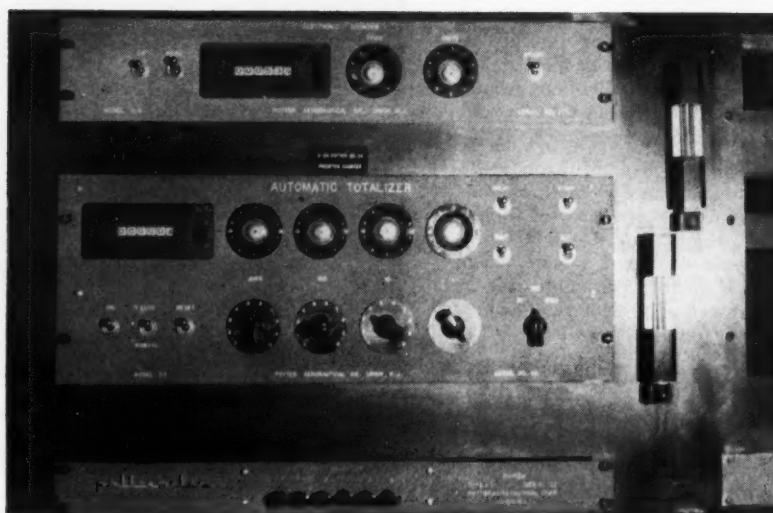
Chemical engineer C. H. Vogel checks flow of hydrochloric acid into reaction vessel. Panel board controls flow of sulfuric and concentrated hydrochloric acids

Cutaway diagram of flowmeter

'Precision' precipitation with concentrated hydrochloric acid is used at Reheis Company to make aluminum hydrogels. Maintaining same accuracy in process as in a laboratory, Reheis . . .

**batches HCl to accuracy
of ½ of 1% . . . consistently**

Closeup of electronic counter (top portion) and automatic totalizer. As a predetermined counter, it controls batching. Numbers appear as multiples of 1000, 100, 10 and 1. Counter at left summarizes count at intervals



cp INSTRUMENTATION & CONTROL

WILLIAM C. CLARKE,
Assistant Editor
S. M. BECKMAN,
Director of Engineering
and Development
Reheis Company,
Berkeley Heights, New Jersey

PROBLEM: Manufacture of aluminum hydrogels requires close control of acidity for precision precipitation. These are slimy, hard-to-filter materials that can only be extracted from nearly colloidal solutions with precise control of acidity. Reacting solutions must be closely controlled, both as to acidity and flow rate, to keep reaction speed and particle growth under control.

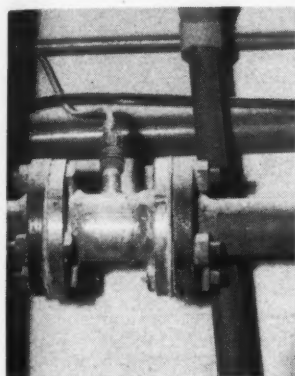
Concentrated hydrochloric acid is used as acidifying agent — feeding through a two inch line into the reaction vessel. This acid, along with the other halogen acids, attacks stainless steel, black iron, and most common materials of construction.

Reheis Company manufactures aluminum hydrogels and related chemicals for high quality end uses in pharmaceutical fields.

Solution: Although usual methods of handling halogen acids involve "sticking" of tanks to measure quantities, Reheis Company could not rely for processing control on such inadequate, inaccurate procedures. Perfection of Hastelloy machining techniques by a meter manufacturer had made possible fabrication of a bearingless electronic flow sensing meter from that metal. Reheis standardized on use of these meters to handle its flow measuring problems.

Only precaution taken installing the meters was to allow for a pressure drop, to a maximum of 6 psi, across the meters in sizing the pumps. A second precaution was to have at least five pipe diameters of straight pipe — without any fittings — before the meter to maintain accuracy. Typical installation is a 1½" electronic flow sensing meter in a 2" line. However, Reheis does use several 2" meters in 3" lines.

Principle of the flowmeter is based on rotation of a small permanent magnet within a spinning rotor. As rotor spins, this magnet sets up an alternating current in an externally-mounted coil of wire held within its field. Total number of pulses generated by sensing element is directly proportional to total quantity of liquid passed through the



Typical installation of electronic flow sensing meter. Instrument is inserted into line with allowance for at least five diameters of straight pipe before the meter. Meter output is taken through leads atop meter. Installation, in this case, is approximately horizontal but can be any predetermined position

unit. Frequency of alternating current produced is directly proportional to rate of flow through sensing element.

Reheis Company uses the flowmeters in conjunction with two electronic flow totalizers located on instrument panel boards. One board monitors quantities of both concentrated hydrochloric and sulfuric acids pumped from storage tanks into process. Second panel board monitors and controls reaction speed and particle growth of the aluminum hydrogels. Flowmeters for hydrochloric acid are of Hastelloy B; other meters are of Carpenter 20 stainless steel.

Results: Even after one year in operation, Reheis has no maintenance on the flowmeters. Maintaining same accuracy in plant operations as in a laboratory — with its use of burets, pipets, and measurements to fractions of a drop,

Turn to next page

MICRO SWITCH . . . FIRST IN PRECISION SWITCHING

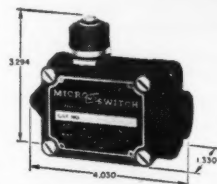


How to cut
processing costs
by making
plant equipment
MORE
AUTOMATIC
... MORE
PRODUCTIVE



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on "Industrial
Enclosed Switches"

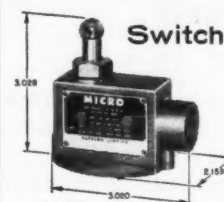
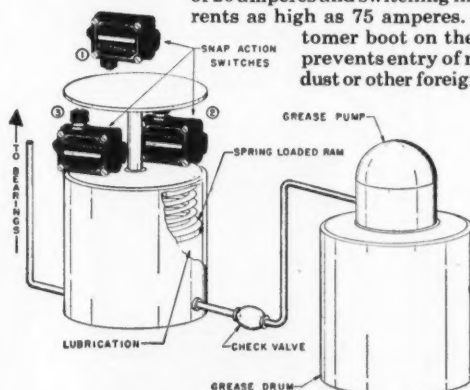
Here are some important uses
plant operating men find for
MICRO SWITCH Precision Switches
as keys to automatic plant controls



Three switches keep
motor bearings
oiled on large
mixing machine

As grease is forced out of the lubricator, the disc on the extended portion of the piston rod actuates Switch 2. This energizes a pump relay, pumping grease into the lubricator. When this is full, the disc actuates Switch 1 which stops the pump. Switch 3 is set lower than Switch 2. If the pump fails to start, the disc descends until it hits Switch 3 which sets off an alarm.

This MICRO SWITCH Type F is a high-capacity switch capable of making and breaking steady state currents of 20 amperes and switching inrush currents as high as 75 amperes. An elastomer boot on the plunger prevents entry of moisture, dust or other foreign matter.

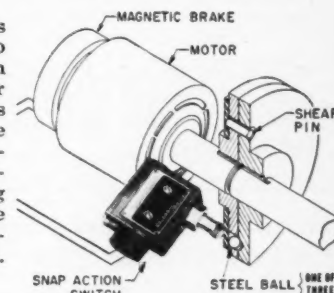


Switch protects against damage
if shaft binds or jams

A plant engineer installed this roller-plunger switch on a shear pin coupling to prevent serious mechanical damage should the driven shaft bind or jam.

Three equally-spaced steel balls bear into drill point seats in the driven disc. The balls are retained in holes in the driving disc by a spring-loaded ring. When the pin shears, the ball moves out of the drill point seats. This lifts the spring-loaded ring which actuates the switch and stops the motor.

The switch used in this application is a MICRO SWITCH Type E switch with a roller-plunger actuator. This switch is designed for cam or slide operation in applications where the approach of the actuating device is in the same direction as the longitudinal axis of the switch.



You can make your machinery more automatic
by using these switches for—

Process controls • Conveyor controls • Bulk
flow controls • Level controls • Counting
controls • Weight controls • Motion controls

MICRO SWITCH

A DIVISION OF MINNEAPOLIS-HONEYWELL REGULATOR COMPANY

In Canada, Leaside, Toronto 17, Ontario • FREEPORT, ILLINOIS



MICRO SWITCH precision switches for plant use
applications are available at authorized distributors
in key cities everywhere. Look under "Switches,
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*Substantial operations" does not necessarily mean an extremely large plant. But requests for the magazine exceed supply so we must set standards to insure publication being sent where it can be used to best advantage.

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Main Products _____

INSTRUMENTATION

Batching HCl

Starts on page 122

Reheis has batched acids to accuracies of 0.5%, and at times to 0.1%.

Reheis Company has been able to manufacture aluminum hydrogels — developing precipitates within precision limits. Reacting fluids, alkalis and acid salts, have been kept within narrow limits of concentration — not only to achieve necessary yields but also high quality requirements . . . consistently.

(Flowmeter is product of Potter Aeronautical Corp., Dept. CP, Route No. 22, Union, N.J. . . . or for more information reader may simply check 5152 on form which is located opposite last page.)

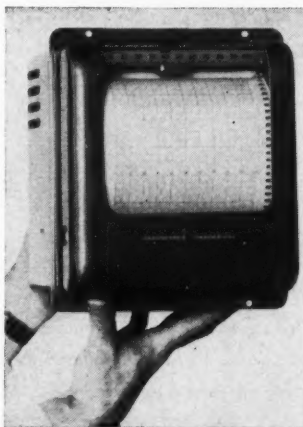
Strip-chart recorder is self-balancing

Can be used as portable
or panel-mounted unit

Uses: Strip-chart recorder was designed for use in laboratory, plant, or field installations requiring a self-balancing unit with a limit of error of 1%.

Features: Measuring circuit is unitized. Recorder can be adapted in the field by selection of appropriate input chassis.

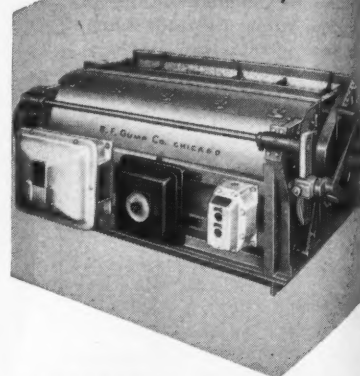
Description: Self-balancing strip-chart recorder provides full scale balancing time of



Strip-chart recorder is light, has unitized measuring circuit

Regulate Bulk Feeding—

and prevent
production
choke-ups!



DRAVER FEEDERS

now available with
automatic timing controls

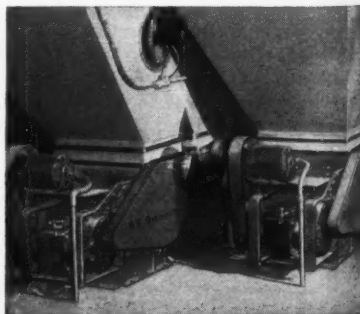
Prevent overloading of grinders, sifters, mixers and other production machines.

Accurate Draver Feeders regulate the flow of dry free- or nonfree-flowing products . . . keep processing equipment operating at most efficient capacity . . . prevent machine failure and downtime. Timing controls are available, for feeding to continuous processes at automatic intervals.

Dependable and durable, Draver Feeders are made in more than 100 sizes and models, with capacities from minute quantities up to thousands of pounds per hour. Original cost and operating expense are low, compared with the production losses they prevent.

What is your bulk feeding problem? Write our engineering department for a solution, without obligation.

Draver "Micro-Master" Feeders, mounted at floor level, feed to mixing equipment below.



FEEDING • MIXING • SIFTING • WEIGHING • PACKING
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When inquiring check 5153
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CHEMICAL PROCESSING

one second. Potentiometer model now available has behind-the-panel span adjustment from 9 to 100 mv. Source resistances as high as 100,000 ohms are permissible.

Rectilinear strip chart is 5 inch in 85 foot rolls. Single, dual, and quadruple chart-speed models are available with speeds from 1/8 inches per hour to 8 inches per minute. Weight is 15 pounds. Over-all dimensions are 8 3/4 x 10 3/4 x 7 3/4 inches.

(Model G-11 recorder is product of Dept. TT, Varian Associates, Dept. CP, 611 Hansen Way, Palo Alto, Calif. . . . or check 5154 opp. last page.)

Sealing out moisture

Switch "boots" prevent entry of dust, moisture, vapors, and other contaminants into standard push-button, toggle,



and rotary switches. Sealing material has resistance to many petrochemical products, remains effective at relatively high temperatures, and has good abrasion resistance.

(Hexseals are product of Automatic & Precision Manufacturing Co., Dept. CP, 252 Hawthorne Ave., Yonkers, N. Y. Check 5155 on form opposite last page.)

AUGUST . . . AND THEN . . . SEPTEMBER

And September is the month for the Instrumentation feature. Part of it will be an up-to-date look at the automated plant . . . a report on a spontaneous panel discussion by more than twenty top experts in the instrumentation and data reduction fields. Read it in September's Instrumentation feature.

Emery

WEIGHING SYSTEM

BIN, TANK AND HOPPER EDITION

No. 5

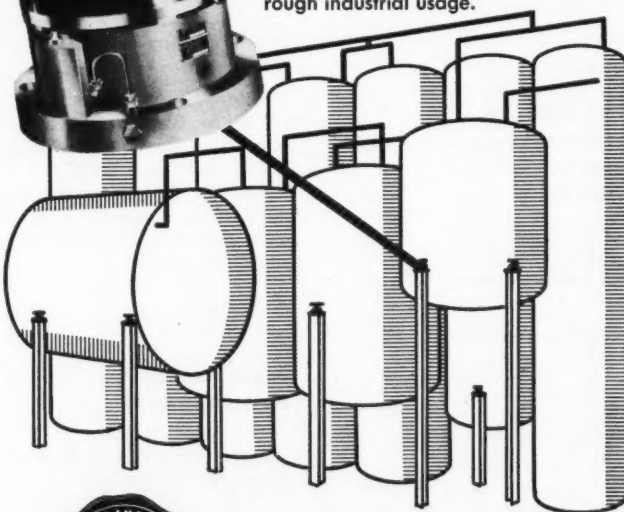
Covering design, development and application data on Emery Weighing Systems for industrial applications

TOP EXECUTIVES FIND EMERY WEIGHING SYSTEMS SUITABLE FOR TOUGHEST WEIGHING APPLICATIONS IN PROCESSING FIELD

Vision And Experience Team Up To Decide On Maintenance-Free Hydraulic Equipment

Men with progressive vision and broad experience in the processing industries are becoming increasingly aware of the need for positive action, extreme accuracy and maintenance-free long service life in the control equipment they buy for their plants. Why? Because in these days of tough "break-even" points and narrow profit margins, they can't afford to take chances.

They know, as well as you do, that laboratory-type apparatus which "needs to be babied" . . . or a weighing system which needs its own electronic engineer . . . just will not stand up under countless hours of rough industrial usage.



THE A. H. EMERY COMPANY
Pine Street • New Canaan, Conn.



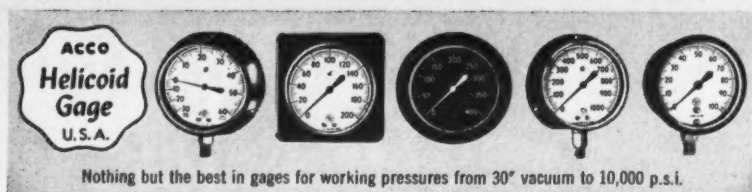
The Emery Load Cell is a "husky" piece of industrial equipment which combines years of satisfactory performance with amazing accuracy. A unique design called the "rolling ball" head accommodates reasonable off-center and cross loads. Even though Emery Load Cells utilize hydraulic pressure as a sensitive medium to measure loading they can be teamed with practically any brand or type of instrumentation manufactured today.

There are many good reasons why top executives are specifying Emery Load Cells for their bin, tank and hopper weighing applications. Our new Bulletin 561 describes them in detail. Send for this literature today.



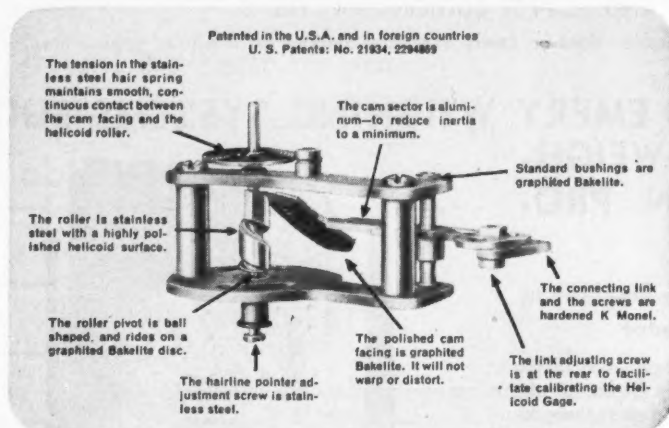
A practical handbook on bin, tank and hopper weighing and the instrumentation involved. Write for it now!

When inquiring check 5156 opposite last page



Nothing but the best in gages for working pressures from 30" vacuum to 10,000 p.s.i.

These details of Helicoid gage design assure longer life and enduring accuracy



The superiority of Helicoid Gages is most evident in severe service—wherever a gage is subjected to violent pressure pulsations or severe mechanical vibrations.

The *sustained accuracy* of Helicoid Gages over millions of cycles is explained by the details of design and construction of the Helicoid movement shown above. Such Helicoid features—protect against wear and corrosion and assure sensitivity, sustained accuracy and trouble-free operation.

The Chemical Gage

The Helicoid Chemical Gage has a guaranteed accuracy of plus or minus 1%. It is applicable for working pressures from 30" vacuum to 5000 p.s.i. and temperatures to 400° F. It is particularly suitable for chemicals and other viscous fluids which might clog or corrode a Bourdon tube. Pressure and/or vacuum is transmitted directly to the indicating gage element through deflection of a Teflon or Kel F sealing diaphragm.



Tubes built for millions of pressure pulsations

To fit the wide range of applications, Helicoid Bourdon tubes are available in four materials—alloy steel, K Monel, stainless steel and phosphor bronze.

All Helicoid tubes are made from seamless tubing and are carefully designed to give maximum torque and minimum stress. When used within the dial range, they will withstand many millions of pressure pulsations and will not stretch, leak or crack.

Helicoid gives you all these features at prices that are competitive in the quality gage field.

For complete information on the Helicoid line of gages write for Catalog G-52



**Helicoid Gage Division
AMERICAN CHAIN & CABLE**

929-P Connecticut Avenue • Bridgeport 2, Connecticut



When inquiring check 5157 opposite last page

INSTRUMENTATION

Lock-down switch is dual purpose

Acts as alternate-action pushbutton control

Uses: As dual-purpose, lock-down miniature switch for panel boards where two switch actions are required.

Features: Combination of two switch actions into one switch saves panel space and need for two switches.

Description: Miniature switch functions as a conventional pushbutton model when pushed straight down.

When pushed and turned approximately 20 degrees clockwise from this position, switch is maintained in operated position. When turned counter-clockwise from this position, switch pops up.

Switch can take place of an alternate-action pushbutton and also provide optional momentary action.

Subminiature bulb illuminates switch. Two subminiature basic switches give snap-action. Rating is 5 amperes 125 or 250v AC.

(Switch 52PB7-T2 is product of Micro Switch, division of Minneapolis-Honeywell Regulator Company, Dept. CP, Freeport, Ill. . . . or for more information check 5158 on form which is located opposite last page.)

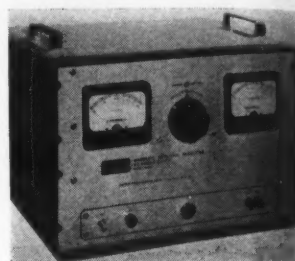
Regulated power for computers

Develops steady state accuracy of $\pm 0.01\%$

Uses: As DC power supply for computer applications and other installations up to 200v and 3 amp.

Features: Power supply develops steady state regulation of $\pm 0.01\%$, with a ripple of less than 50 mv peak-to-peak.

Description: Power supply has a low dynamic impedance and incorporates a magnetic amplifier with electronic control. Dynamic regulation is $\pm 1\%$ for a $\pm 15\%$ step in AC input, $\pm 1\%$ for a 50%



Rectifier power supply for computers has steady state regulation of $\pm 0.01\%$

load change. Unit is designed for AC input of 208/230v, 3 phase, 60 cycle $\pm 15\%$. Saturating type AC regulators or large energy storage capacitor banks are not employed.

(Computer power supply is product of Perkin Engineering Corporation, Dept. CP, 345 Kansas St., El Segundo, Calif. . . . or check 5159 on form opposite last page.)



Surface temperatures

. . . can be measured with resistance thermometer in presence of radioactive fields, high humidity, water, salts, oils, some acids, caustics. Strap-on thermometer is reusable.

(RdF Strap-on is product of Arthur C. Rugge Associates, Inc., Dept. CP, Cambridge, Mass. . . . or for more information check 5160 on form opposite last page.)

INSTRUMENTATION

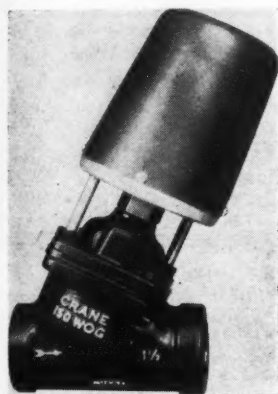
Electric valve control provides remote operation

Self-contained gear motor takes stems to 1 inch

Uses: As all-electric rotary valve controller for remote or automatic valve operation with proportional or on-off control.

Features: Mounts directly on valve stem; has built-in potentiometer for remote indication or part of balanced-bridge control.

Description: Unit is self-contained gear motor with hollow output shaft to receive



Electric valve controller mounted on 1½-in diaphragm valve

valve stem. On rising stem valves, adaptor "swallows" stem, from ¼ inch to 1 inch. Controllers are designed for valves of all leading manufacturers. Unit is mounted with a hex stock adaptor so valve can be turned by wrench in power failure.

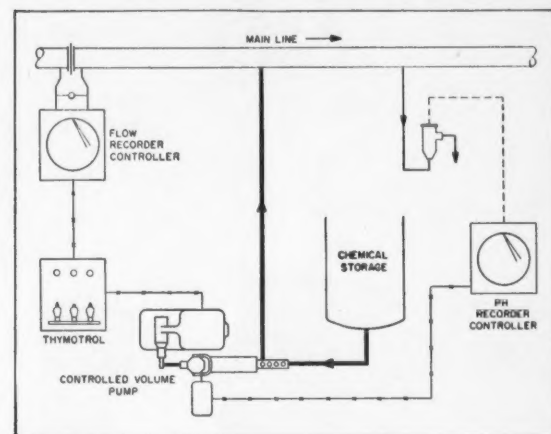
When unit is used as part of balanced bridge circuit, controller will provide valve setting proportional to signal originating from remote source. Signals may be in accordance with liquid level, flow rate, pressure, or other variables. Units can be furnished to provide follow-up accuracies of $\pm 1/25$ of one percent. Standard units provide accuracies of $1/5$ of 1%.

(Valvetrol valve controller is product of The Jordan Company, Inc., Dept. CP, 3235 W. Hampton Ave., Milwaukee 9, Wisc. Check 5161 on form opposite last page.)



A Milton Roy Controlled Volume Pump with pneumatic stroke length adjustment.

In pH control systems, such as the one illustrated, flow rate may vary. To keep the chemical feed in proportion to the varying flow rate, an open loop chemical feed control system is added to the closed loop pH control system, which automatically adjusts chemical feeding rates for changes in pH. A Milton Roy Controlled Volume Pump through speed and stroke length adjustment acts as final control element for both flow and pH controllers.



For highest product quality... use Controlled Volume Pumps as final control elements

Ultimate quality of your product is assured when you use Milton Roy Controlled Volume Pumps to regulate feed and distillate rates. As final control elements in the control loop, they contribute to accurate regulation of your process variables . . . are accurate in delivery within $\pm 1\%$.

Milton Roy Controlled Volume Pumps also serve as flow controllers . . . simultaneously metering and pumping process fluids. Or, they can serve as ratio controllers . . . maintaining a fixed relationship between any number of process streams. Available in simplex, duplex, and multiple liquid end types. Capacities from 3 milliliters per hour to 22.5 gpm per liquid end. Pressures to 50,000 psi.

If you'd like to discuss Controlled Volume Pumps in more detail, visit our booth at the ISA Show . . . No. 1339. Milton Roy engineers will be glad to show you how these pumps can provide a solution to your low-capacity flow control problems . . . how these pumps fit into the process instrumentation picture.

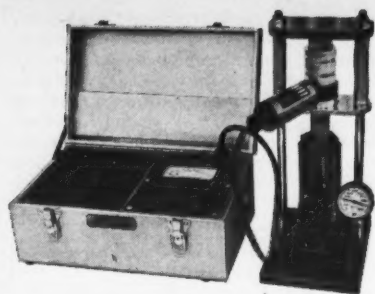
MILTON ROY COMPANY, Manufacturing Engineers, 1300 E. Mermaid Lane, Phila. 18, Pa.

Engineering
representatives in the
United States, Canada,
Mexico, Europe,
Asia, South America,
Australia, Africa.



VISIT OUR BOOTH
NO. 1339, 1341
at the
ISA SHOW
SEPT. 9 to 13, 1957

When inquiring check 5162 opposite last page



**Is improper moisture
in your products...**

adding to operating expense?
☐ yes ☐ no

slowing production for tests?
☐ yes ☐ no

bringing customer complaints?
☐ yes ☐ no

Any yesses? Then it will pay you to find out how the Granular Moisture Register model G5, operating on high frequency power loss principal, will indicate moisture content quickly and dependably, help solve those problems with...1-minute tests on the spot!
•Practical Accuracy Guaranteed!
•No skilled technicians! •Two weeks free trial!

**Most granular products
such as:**

Ammonium Nitrate • Ammonium Sulphate
 • Toilet Soaps • Plastic Molding Compound
 • Polyvinyl Chloride • Ammonium Perchlorate • Sodium Bicarbonate • Polyethylene

Resins

DOZENS MORE

MOISTURE REGISTER Instruments

Moisture Register Co., Dept. CP8
 P. O. Box 910, Alhambra, Calif.

☐ We are interested in 2 weeks free trial offer. Send additional information regarding Model G5.

We will want to test _____

in a moisture range from _____% to _____%.

Firm Name _____

By _____ Title _____

Address _____

City _____ State _____

When inquiring check 5163
 opposite last page

INSTRUMENTATION

**Metal valve actuators
designed for nuclear
applications**

Can be applied in highly
corrosive conditions

Uses: For operation under difficult conditions as atomic radiation, high temperatures, corrosive atmospheres.

Features: Valve actuators are all metal and are designed for both pneumatic and hydraulic control systems.

Description: Actuators are available with control valves as complete control units, or as additions to existing valve installations. Some are designed to function either "air to open" or "air to close". Action is easily reversible in field.

One model, for use in highly corrosive atmospheres, is made with stainless bellows and stem with cadmium-plated frame.

Valve actuators are available in three ranges of signal pressures: 3 to 15 psi; 6 to 30 psi; and 9 to 45 psi. Maximum thrust is 3000 pounds. Models are also available for less critical situations.

(All-metal valve actuators are product of Fulton Sylphon Division, Robertshaw-Fulton Controls Company, Dept. CP, Box 400, Knoxville 1, Tenn. . . . or for more information check 5164 on form opposite last page.)

**Ultrasonic flowmeter
will measure fluids
of low viscosity**

Designed for operation with
liquid oxygen, water

Uses: Measuring mass flow rates of liquid oxygen, water, and other low viscosity fluids, as kerosene.

Features: Ultrasonic flowmeter will measure flow rates without putting any obstruc-

NEW, Pyrometer Indicator

Null Balance, Potentiometer Type

MINIMITE

Has 23½ Inch Double Scale



Small Size Extremely small and compact, this null balance Portable Potentiometer Indicator weighs under four lbs. and measures only 4" x 5" x 6".

Scale Range Despite its small size the "MiniMite" has a 23½ inch double range scale. There are 15 available scales for all standard thermocouple materials. These scales include temperature ranges from -300°F. to +3200°F. and millivolt ranges from 0 to 62. Measuring accuracy is ¼ of 1% of scale range.

Dual Application The "MiniMite" can measure temperature directly when connected to a thermocouple, or check other potentiometer or millivoltmeter-type instruments when used as a calibrating instrument.

Write for Bulletin 64-R.

Thermo Electric Co., Inc.

SADDLE BROOK, NEW JERSEY

In Canada - THERMO ELECTRIC (Canada) Ltd., Brampton, Ont.

When inquiring check 5165 opposite last page

Complete rectification
 "packages" for operation
 of electrolytic cells...



GERMANIUM RECTIFIERS

kw - any rating up to 30,000 Kw
 (or higher) •

voltage - any rating up to 400
 volts (or higher)

efficiency - up to 96%

Literature on request

Dept. CP-8

Rectifier Division

SEL-REX CORPORATION

NUTLEY 10, NEW JERSEY (Offices: Detroit, Chicago, Los Angeles)

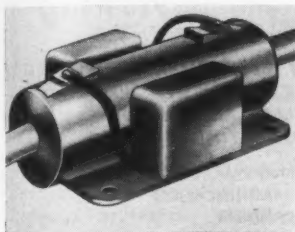
When inquiring check 5166 opposite last page

CHEMICAL PROCESSING

INSTRUMENTATION

tion in fluid path.

Description: Instrument measures flow rate by modification of an ultrasonic beam. Flow is straight-through without any obstruction in path. Pressure drop is said to be eliminated since control unit is mounted on outside.



Ultrasonic flowmeter mounts externally to fluid flow path

Instrument is designed for flow rates of 1000-4000 gpm with better than 2% accuracy on Model "A" units, 1% accuracy on Model "B" units. Unit provides a 5-volt full scale output signal for feed into standard telemetering and recording systems. Sizes are for 2, 7, and 9" OD lines.

(Models UF-100A and B ultrasonic flowmeters are product of Vibro-Ceramics Division, Gulton Industries, Inc., Dept. CP, 212 Durham Avenue, Metuchen, New Jersey . . . or for more information check 5167 on the convenient Reader Service slip which is located opposite last page.)

FOR MORE INFORMATION

Here's what to do when you want additional details about products and services mentioned in this issue's editorial articles or advertisements.

Note the number at end of article or advertisement. Check this key number on Reader Service Slip opposite last page of this issue. Fill in Slip with the other pertinent information (name, title, company, address, product made). Mail to our Reader Service Department.

We'll contact the manufacturer for you. He'll send you the details direct.

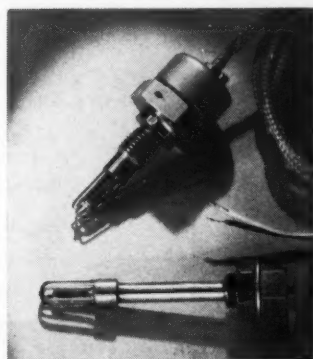
Temperature pick-ups have fast response

For use with noncorrosive liquids and gases

Uses: For sensing temperature of noncorrosive liquids and gases.

Features: Temperature pick-ups have high-speed thermal response of less than 2.5 seconds in air and less than 50 milliseconds in water.

Description: Platinum resistance thermometers are designed to operate over a temperature range from -320°F to 750°F with accuracy of better than $\pm 1\%$ of full scale.



Platinum temperature pick-ups have high speed response

Repeatability is 0.2%. In addition, units can deliver up to 5 volts directly to telemetry commutation circuits without additional amplification.

Platinum resistance winding is supported on mica cards. Body of instrument is stainless steel. Mounting nut is machined to seat against a metal O-ring to provide pressure-tight seal in vessel wall. Leads are Teflon-covered, protected with stainless steel braided shielding.

Pick-ups are designed to withstand pressures to 1500 psia. Resistance change is 100 ohms over temperature range. Maximum continuous current rating is 20 ma, rms.

(Platinum resistance thermometers are product of Trans-Sonics, Inc., Dept. CP, Burlington, Mass. . . . or for more information check 5168 on form opposite last page.)

for accurate metering of compounds

In the oil fields . . .
on pipe lines . . . in your
power house . . . wherever the
metering of various liquids
calls for accuracy, you'll find
a Manzel. Adjustable from
0 to 1 gallon per minute.
Experienced field engineers
available for consultation.

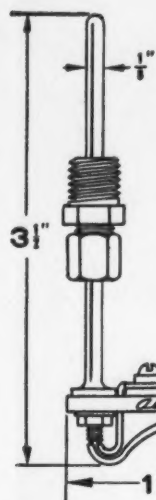
Manzel

LUBRICATORS • CHEMICAL FEEDERS • SLURRY PUMPS

A Division of Houdaille Industries, Inc.

When inquiring check 5169 opposite last page

Alnor[®] pyrometer supplies



Model 3480 small pipeline thermocouple. Precision built to Alnor performance standards. Unit price: \$9.00.

Thermocouples, alloy wire, and accessories

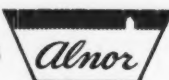
Choice is unlimited at Alnor, where you'll find thermocouples as small as 1/4" O.D. and more unique, proven thermocouple designs than at any other available source. Each thermocouple is individually calibrated for its specific application—all of the same type are interchangeable without recalibrating instrument.

Bulletin 4181... lists thermocouples and accessories of all types and alloys for every temperature measurement from -100° F. to 3000° F., to ISA Standards. Also contains complete engineering information such as alloy curves, uses and limitations of alloys, millivolt relationship tables, etc.

Bulletin 4257... lists surface temperature thermocouples and accessories available from Alnor.

Circle bulletin number you want, attach this ad to your letterhead and mail to: Illinois Testing Laboratories, Inc., Room 504, 420 N. LaSalle St., Chicago 10, Ill.

**PRECISION INSTRUMENTS
FOR EVERY INDUSTRY**



When inquiring check 5170 opposite last page



Single-Point
pH Recorder
(Strip Chart Assemblies also available)

CAMBRIDGE pH INDICATORS and RECORDERS

Labor saving — profit producing!

In addition to portable pH Meters, Cambridge makes line-operated Direct Reading pH Indicators and Recorders for permanent installation. They are accurate, stable and assure continuous and trouble-free performance. Either the Recorder, Indicator or both, may be located at any reasonable distance from one or several sampling points. The Glass Electrodes are placed in vapor-tight housings of clog-free sampling chambers.

Send for Bulletin No. 910 Y

CAMBRIDGE pH EQUIPMENT

CAMBRIDGE INSTRUMENT CO., INC.

3512 Grand Central Terminal, New York 17

**PIONEER MANUFACTURERS
OF PRECISION INSTRUMENTS**

When inquiring check 5171 opposite last page

INSTRUMENTATION

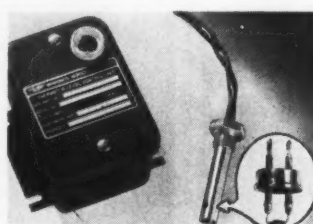
Level sensing system for liquefied gases

Has no moving parts; will actuate controls

Uses: Indicating liquid level of liquefied gases including liquid oxygen, nitrogen, hydrogen, anhydrous ammonia.

Features: Has no moving parts; will actuate controls to start or stop pumps, or operate valves.

Description: Adapted from system for indicating fuel levels in military aircraft,



Liquid level sensing system is resistant to shock and vibration

level sensing device operates on either AC or DC power. System will operate a light to indicate whether liquid is above or below a certain level. Device is resistant to shock and vibration. One model operates in liquids from -55°C to 75°C. In some applications, liquid temperatures higher than 75°C can be handled.

(Liquid level sensing system is product of Simmonds Accessories, Dept. CP, 105 White Plains Road, Tarrytown, N. Y. . . or for more information check 5172 on the convenient Reader Service slip opposite last page.)

Diaphragm control valves

Details on construction of single-seated and double-seated diaphragm control valves are presented in two specification sheets. Sizes, materials, plug characteristic curves, dimensions, and cross-section drawings of each type are included. Specs S810-11 and S810-12 — Industrial Div., Minneapolis-Honeywell Regulator Company, Dept. CP, Philadelphia 23, Pa. Check 5173.



- SHARP DEFINITION AND CLARITY
- TRUE COLOR
- COMPLETE RELIABILITY
- NO OPERATING COST

Available with these custom features:

- SELECTIVE MAGNIFICATION
- REMOTE SCANNING
- WIDE FOCUSING RANGE
- "NON-BROWNING" OPTICS
- BUILT-IN RADIATION SHIELD
- INTEGRAL CAMERA ADAPTER
- MICROSCOPE RELAY
- BINOCULAR EYEPIECES
- UNDERWATER DESIGNS

Send for Bulletin 301.



When inquiring check 5174 opposite last page

Splash Proof Moisture Tight Semi-Dust Tight

Drip Tight

MERCOID[®]
WEATHER RESISTANT.
CONTROLS

NEMA 1A, 2, 3, 4



Available for Pressure or Temperature

WRITE FOR BULLETIN 6-18

THE MERCOID CORPORATION
4201 Belmont Avenue, Chicago 41, Illinois

When inquiring check 5175 opposite last page

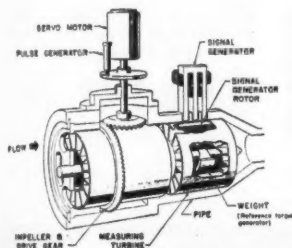
CHEMICAL PROCESSING

Converts mass flow rate directly into output for digital readout

Solves problem of extreme temperatures

Uses: As flow meter for measuring flow rate of liquids, vapors, gases, or multiphase temperatures, from those of cryogenic fluids (-423°F) to high temperature gases (1000°F).

Features: Digital mass flow meter overcomes problem of extreme temperatures with built-in reference, which is self-compensating for temperature.



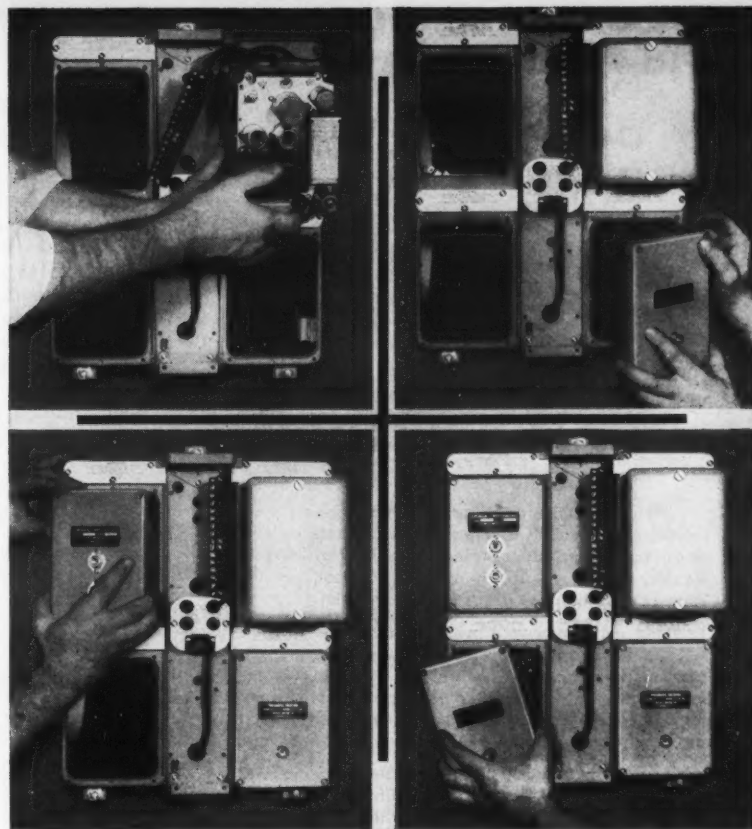
Flowmeter for extreme temps

Description: Speed of rotation of impeller is used to develop signal proportional to flow rate. Magnetic pulse generator produces one electrical impulse per revolution of impeller. Reference weight is suspended on arm whose length varies with temperature. Thus temperature variations are compensated by expansion of torque-producing arm.

Flowmeter can be powered by 115v AC. System components are mass flowmeter transmitter, servo amplifier, and digital readout device. Digital output can be fed directly into a digital data processing system. Electrical components are completely isolated from corrosive flows.

(DIGIMAF flow meter is product of Inertial Instruments Inc., Dept. CP, 1738 Colorado Ave., Santa Monica, Calif. . . . or for more information check 5176 on the convenient Reader Service slip opposite last page.)

CUSTOM BUILD your own Bailey Recorder



These four views of the back of a Bailey Recorder show how four plug-in units may be added as needed to meet almost any recorder application.

The freedom and flexibility of "do-it-yourself" instrumentation is yours in the Bailey Recorder. A variety of plug-in units make it possible to record, control, and retransmit any variable that can be converted to a pneumatic or electric signal.

The basic plug-in units are the Bailey a-c and d-c Electronic Receivers and Pneumatic Receivers. Any four of these may be used in one recorder, intermixed in any way, to provide four continuous records on one chart.

For automatic control, other plug-in units are available.

For square root extraction or linear integration, there are two plug-in variations of the Bailey Integrator.

When you want a pneumatic signal that varies

according to a pre-set pattern plug in a Bailey Program Controller.

Periodic running time of a condition or process is recorded on the chart when a Bailey Running Time Recorder is used.

These and other plug-in units are described in Product Specification E12-5. Some companies stock Bailey Recorder cases and assorted plug-in units. As instrumentation and control needs arise they build up the kind of recorder-controller required, using the proper plug-in units from stock. Unmatched versatility such as this means lower instrumentation costs.

For the complete story of how easily you can custom build this recorder to your needs, see your Bailey Engineer.

G43-1



Instruments and controls for power and process

BAILEY METER COMPANY

1074 IVANHOE ROAD • CLEVELAND 10, OHIO

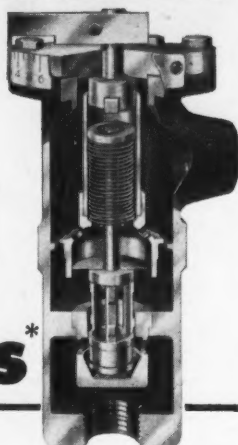
In Canada — Bailey Meter Company Limited, Montreal

When inquiring check 5177 opposite last page

Need Adjustable-Constant Flow Rates?

**DON'T
Build a
System ...**

Install a
Kates*

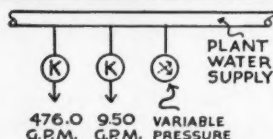


* KATES Direct-Acting Flow Rate Regulators are complete in themselves, requiring no outside connections except inlet/outlet piping; for light slurries, clear liquids, and many suspensions; hold constant flow despite 125-psi jumps or drops in inlet-to-outlet pressure.

Economy may not be your principal reason for selecting a Kates regulator, but added to the single-unit compactness and no-hunt, no-lag features it is certainly a valued extra. And you will save on maintenance, too. Kates regulators are designed to eliminate wire-drawing, and the only packing is on the infrequently-used dial stem.

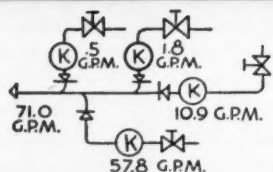
Write us for more details on the unique operating principles and practical design features of Kates flow rate regulators. But first, here are some of the problems that Kates has solved for others — economically.

PROCESS WATER CONTROL



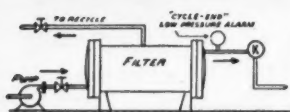
Pressure of most plant water fluctuates badly — whether it comes from city mains or in-plant pumps. If you need selected-constant flow, from 0.02 to 550 G.P.M., DON'T build a system. Install a Kates.

PROPORTIONATE BLENDING CONTROL



Where many ingredients go into one blend, and must be in exact proportion, a control system for each ingredient would cost plenty. But a Kates control on each feed does the job inexpensively, and each unit can be reset for a blend change.

PRESSURE FILTRATION CONTROL



As filter cake builds up, a constant valve-jockeying is needed to smooth out flow. A Kates control in the effluent compensates for rising pressure drop, keeps filter at best rating.

Write for Technical Bulletin — TODAY

Kates

W. A. KATES COMPANY
Department A.
430 Waukegan Rd.
Deerfield, Illinois

When inquiring check 5178 opposite last page

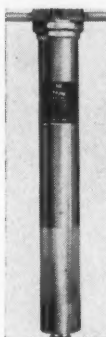
INSTRUMENTATION

Gives moisture-free instrument air

Uses: Removing water vapor from compressed gases in instrument line.

Features: Indicator turns from blue to pink when cartridge needs changing. Head of air dryer is mounted "straight through" in line, need not be removed for servicing.

Description: Air dryer is desiccant-dehydrator consisting of a head, case, and desiccant cartridge. Case which contains cartridge screws onto head and has a drain-cock in bottom. Air enters from right, flows down, around and up through cartridge, and through saturation indicator. Saturated cartridge can be reactivated by heating.



Instrument air dryer

Case and head are bronze and brass. Cartridges are plastic-coated aluminum, filled with Sovabead desiccant. Inlet and outlet are threaded 1/4" NPT. Head diameter is 3 inches, overall height is 19 1/2 inches.

Dryer provides dew point of — 60 degrees F or lower, can be used at gage pressure of 100 psi. It has capacity of 60 scfh at 70°F.

(Air dryer model CMK-1 is product of King Engineering Corporation, Dept. CP, Box 645, Ann Arbor, Michigan. Check 5179 opp. last page.)

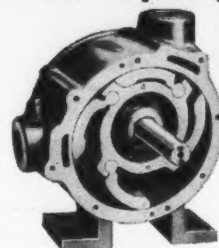
Two-pen zone recorder—two instruments in one

Designed for comparative measurements on same chart

Uses: As two-pen two-zone recorder for comparative measurements in laboratory or plant.

Features: While recorder is actually two independent instruments in one, it is housed in single case, 17 3/4 inches wide, to fit standard racks.

LEIMAN AIR PUMPS maintain rated capacity for years and years



4 WING TYPE

Vacuums to 20" Hg. Pressures to 15 psig. Displacement to 162 c. f. m.



2 WING TYPE

Vacuums — to 29.9" Hg. Pressures — to 20 psig. Displacement — to 40.8 c. f. m.

Take up their own wear to assure leakproof seal

Wear and trouble have been designed out of Leiman Air Pumps. The rotating wings (cast iron in the 4-wing type, steel in the 2-wing type) hone the cast iron cylinder walls to glassy smoothness. Negligible wear is automatically taken up, maintaining "new pump" efficiency for periods of 10, 15 and 20 years.

Leiman Air Pumps have fewer moving parts—no tips or blades to renew—need no maintenance except occasional oiling—run quietly and trouble-free. Wide range of sizes and models for countless vacuum, suction and pressure jobs. Distributors and engineering assistance available in all industrial centers.

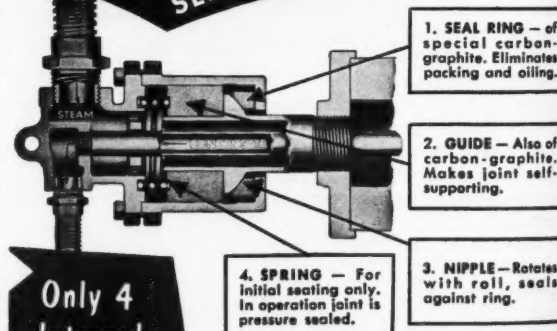
Write for 12-page Catalog and Application Book showing 60 "how-to-do-it" blueprints.

LEIMAN BROS., Inc.
220 Christie St., Newark 5, N. J.

LEIMAN
Rotary Air and
VACUUM PUMPS

When inquiring check 5180 opposite last page

JOHNSON Rotary Pressure JOINT SELF-SUPPORTING TYPE



1. SEAL RING — of special carbon-graphite. Eliminates packing and oiling.

2. GUIDE — Also of carbon-graphite. Makes joint self-supporting.

3. NIPPLE — Rotates with roll, seals against ring.

4. SPRING — For initial seating only. In operation joint is pressure sealed.

Only 4
Internal
Parts

For introducing steam and liquids into rotating rolls and cylinders, there's nothing like the Johnson Joint above. It's packless, self-lubricating, self-adjusting, self-supporting. It has been

adopted by dozens of machinery makers, and is finding new uses every day.

Type SB shown handles both steam and condensate through same head; also available for through flow service, and in sizes and styles for all operating conditions. Write for literature.

The Johnson Corporation

826 Wood St., Three Rivers, Mich.

When inquiring check 5181 opposite last page

CHEMICAL PROCESSING

NEW! direct tank-mounted LIQUID LEVEL TRANSMITTER

with DIRECT
3-15 psi
air output signal

IDEAL FOR: Viscous or
corrosive fluids, slurries,
and solids-in-suspension,
as well as "easy-to-
measure" fluids.

Now you can measure the level of
"difficult" or easy-to-measure fluids
— economically, without the compli-
cation of floats or bubble tubes, and
with sustained high accuracy over
the entire range span.

Flange-mounted directly to the side
of an open or closed tank, the Type
13FA Transmitter eliminates piping
and purging. Its stainless steel dia-
phragm capsule senses level changes
instantly. Conventional tubing leads
its output air signal directly to stand-
ard 3-15 psi receiver-recorders and
controllers without need for inter-
mediate signal converters.

The 13FA provides an accurate,
trouble-free solution for level meas-
urement problems. Write for detailed
information, or ask your nearby Fox-
boro Field Engineer to explain its
application to your specific process.
The Foxboro Company, 818 Nepon-
set Ave., Foxboro, Mass., U.S.A.



Exclusive static pressure
connection for closed
vessels above or below
atmosphere . . . elimi-
nates need for second
instrument.

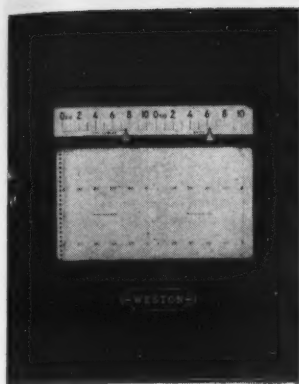
This sensing diaphragm capsule
flange-mounts directly on side of tank.
All wetted parts of Type 316 stain-
less steel, with optional plastic coat-
ing for further corrosion protection.

FOXBORO

REG. U.S. PAT. OFF.

LIQUID LEVEL TRANSMITTERS

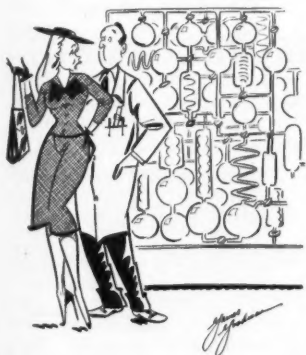
When inquiring check 5183 opposite last page



Recorder has two pens and two
separate recording ranges

Description: Instrument uses
two electronic amplifiers of
plug-in design for easy servic-
ing. It also has two separate
measuring circuits with re-
placeable range standards on
either one or both zones as
desired. Alarm switches are
available for each zone and
can be set in a matter of sec-
onds. Slide wires are inter-
changeable and totally en-
closed for protection. Chart
speeds are available from one
inch per hour to one inch per
minute.

(Model 6791 Type 1 recorder
is product of Weston Electrical
Instrument Corp., sub. of Day-
strom, Inc., Dept. CP, Newark
12, N. J. . . or for more infor-
mation check 5182 on form
opposite last page.)



"I suppose you have a little
story to go with all that!"

50% MORE TERMINALS IN THE SAME SPACE!

SQUARE D's NEW TERMINAL BLOCKS



Write for Terminal Blocks Bulletin...
Square D Company, 4041 N. Richards St., Milwaukee 12, Wis.



When inquiring check 5184 opposite last page

King MANOMETERS

Every Size — for Every Service

U-Type Manometers

- Single Cleanout
- Single Gland-Packed
- Double Cleanout
- Double Gland-Packed
- High Pressure

Low in price
Trouble-free
Easy to install
and read

Well-Type Manometers

- Low Well
- Raised Well
- Barometric Reading

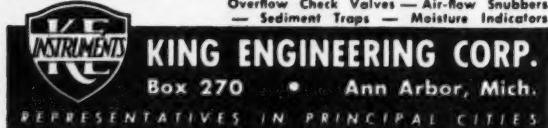
Stay clean
longer
Easy to service

Multi-Tube Manometers

- Multi-Well
- Common-Well
- Special-Purpose

FREE LITERATURE gives sizes, construction and prices. Write today! And ask for informative 12-page Manual on Manometers.

KING ENGINEERING PRODUCTS include King-Gages — Manometers — Self-Closing Push Valves — Pressure Transmitters — Sight Feed Bubblers — Overflow Check Valves — Air-Flow Snubbers — Sediment Traps — Moisture Indicators



When inquiring check 5185 opposite last page

INSTRUMENTATION

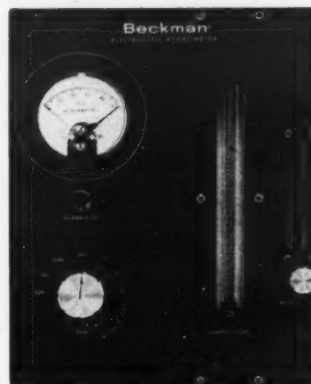
Measures water vapor in low ppm range

Panel-mounted instrument
has an alarm system

Uses: Controlling corrosion, product purity, and process efficiency by monitoring water vapor in plant process stream.

Features: Vapor analyzer has alarm system that can be set for any point in instrument's range.

Description: Analyzer automatically and continuously



Panel-mounted water vapor analyzer can be used for continuous monitoring

measures water concentrations in vapor samples with a 5% accuracy in 0-1000 ppm range. Operates to temperatures of 100°C.

Analysis is performed by continuously passing a sample gas stream through analytical element that absorbs and electrolyzes all moisture present. Current required for electrolysis is measurement of water present. Standard potentiometric recorder, or recorder-controller, 10 or 50 millivolt, can be operated from instrument's output. Continuous monitoring of water vapor in process stream is thus possible.

Panel cut-out dimensions are approximately 10 x 12".

(Panel Mounted Hygrometer is product of Process Instruments Division, Beckman Instruments Inc., Dept. CP, 2500 Fullerton Road, Fullerton, Calif. . . or for more information check 5186 on the convenient Reader Service slip opposite last page.)

TEMPERATURE AND PRESSURE INSTRUMENTS FOR THE PETROLEUM AND CHEMICAL INDUSTRIES

A. INDUSTRIAL THERMOMETERS
Available in 5, 7, 9 and 12 inch case sizes in all ranges, metals and fittings, including patented Adjust-Angle. Request catalog 125A.

B. RECORDING THERMOMETERS
Vapor, liquid or mercury filled systems in 8, 10 or 12 inch chart sizes with 1 to 4 pens. Portable, wall or flush mounted. Request catalog 325A.

C. DIAL THERMOMETERS
In vapor, gas, liquid or mercury filled systems — 3/16, 1/8, 1/4, 3/8 and 1/2 inch cases of phenol, aluminum or brass. Request catalog 325A.

D. ENGRAVED STEM GLASS THERMOMETERS
Laboratory grade, precision and to A.S.T.M. specifications. All types, sizes and ranges to meet all requirements. Request catalog 225A.

E. SCOOPMASTER TANK THERMOMETERS
14 inch chemical and heat resistant plastic cases. 120 ml cap. up to A.P.I. and A.S.T.M. requirements. Request cat. 425A.

F. PRESSURE GAUGES
All standard ranges furnished in 3/16, 1/8, 1/4, 3/8, 1/2 inch cases. Cases are phenol, aluminum and brass for direct, wall or flush mounting. Request catalog 525A.

WEKSLER THERMOMETER CORP.

195 E. MERRICK ROAD, FREEPORT, L. I., N. Y.

When inquiring check 5187 opposite last page

A NEW Development from

AUTO-LITE

INKLESS TEMPERATURE RECORDER!

The newest advance in temperature recording . . . Auto-Lite model 2200 operates completely without ink. It simplifies temperature recording for most processing operations.

- 2 small mercury batteries in case energize transistor oscillator connected to stylus arm.
- Stylus records temperature on 6" evenly calibrated sensitized chart.
- Battery life approximates 2000 hours.
- Records operating temperatures for 24-hour or 7-day cycles.
- Easily serviced — minimum maintenance.

THE ELECTRIC AUTO-LITE COMPANY
INDUSTRIAL THERMOMETER DIVISION
TOLEDO 1, OHIO
NEW YORK • CHICAGO • SARNIA, ONTARIO

Electric or mechanical chart drive available for either 24-hr. or 7-day rotation. In wall mounting, portable and self-contained type cases. Remote reading with capillary tubing. Temperature charts in ranges from -40°F to +550°F. Write for further information.

TEMPERATURE RECORDERS & INDICATORS

When inquiring check 5188 opposite last page

CHEMICAL PROCESSING

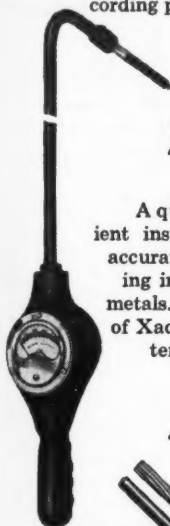
PRECISION TEMPERATURE

measurement
and control



GORDON XACTLINE

Controls temperature automatically within a fraction of a degree in any heat process. A complete factory-assembled unit ready for installation anywhere. Can be used with any existing indicating or recording pyrometer controller—regardless of age.



GORDON XACTEMP Hand Pyrometer

A quality-built, convenient instrument for quick, accurate temperature reading in molten nonferrous metals. Also, other models of Xactemp for all-around temperature checking.



GORDON SERV-RITE

Thermocouple Wire
Thermocouple Extension Wire

Insulated in Gordon's own plant to assure consistent quality. All standard wire and insulations carried in stock for quick delivery. Other wires, in long or short runs, manufactured to specifications.

Full Particulars on Request

**GORDON
SERVICE**

CLAUDE S. GORDON CO.

Manufacturers • Engineers • Distributors
Temperature Control Instruments • Thermocouples & Accessories • Industrial Furnaces & Ovens • Metallurgical Testing Machines

603 West 30th Street, Chicago 16, Illinois
2031 Hamilton Avenue, Cleveland 14, Ohio

When inquiring check 5189
opposite last page

INSTRUMENTATION

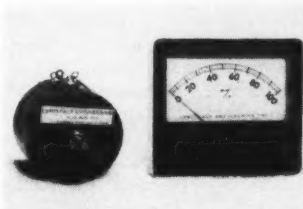
Remote indication units
are 'matched' for
linear response

Give linear output over 320
degree range

Uses: For centralized indication and control of remotely located valves, gates, and feeders.

Features: Transmitter gives a linear output over a 320 degree angular range.

Description: Matched transmitter-receiver pair for remote indication of angular position requires only two wires from transmitter. Number of receivers can be connected in



Remote position indicator-transmitters are matched for linear response

parallel to one transmitter without reduction of three percent accuracy.

Receiver has provisions for "zeroing in" at upper and lower limits of scale. Power source of 110-120v AC must be regulated.

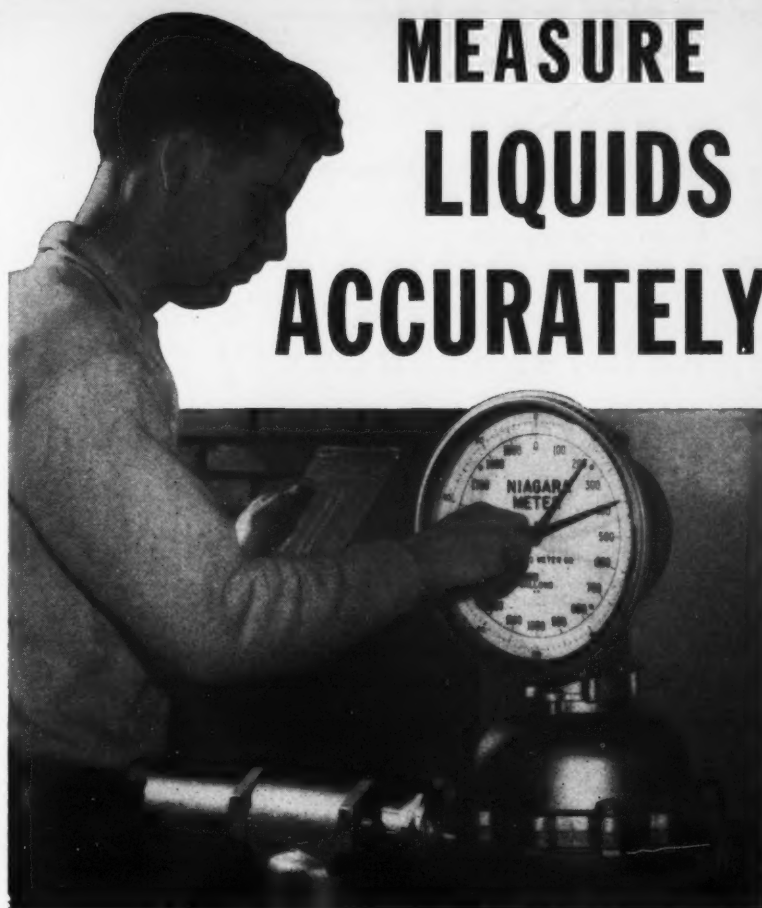
Receivers are available with adjustable alarm or limit contacts at high, low, or both ends of scale.

(Model PI-1 remote position indicator is product of Certi-Fact Engineering, Inc., Dept. CP, P. O. Box 774, Sherman Oak, Calif. . . . or for more information check 5190 on the convenient Reader Service slip which is located opposite last page.)

What's all this about
"Executive Size" . . . ?

For explanation
turn to page 94

MEASURE LIQUIDS ACCURATELY



UP TO 1000 GPM WITH NIAGARA Displacement Meters

Measurement of liquids in any process is only as dependable as the accuracy of the measuring equipment. Niagara Meters measure volumetrically. Each rotating cycle of the piston displaces a fixed volume which remains constant for any specified liquid and temperature range. Niagara Meters are individually tested and calibrated to close tolerances at all rates of flow within their capacity.

Accurate measurement prevents waste and loss. Liquid formulas can be processed with accuracy insuring greater uniformity of product.

Learn all the facts . . . Mail the coupon for complete information.

**BUFFALO
METER CO.**
2892 Main Street
BUFFALO 14, NEW YORK

Please send me information on the complete line of Niagara Meters.

Liquid.....
Flow g.p.m..... Temp.....°F
Name.....
Company.....
Address.....

When inquiring check 5192 opposite last page



Nickel sulfate crystals have to be handled gently if their lustre and brilliance is to be preserved. ASARCO, in producing uniform, brightly colored crystals finds that . . .

natural frequency conveyor-dryer increases product sales appeal



Conveying-drying system handling nickel sulfate crystals consists of a horizontal vibrating dryer and a natural frequency spiral elevator. Vibrating dryer has fine wire screen deck mounted 6" above bottom. Crystals ride on screen and are dried by warm air passed through screen

Problem: Sales appeal of nickel sulfate crystals is greatly enhanced, if they are brilliant, sparkling green, uniform in size, and free from discoloration and broken edges. These qualities are difficult to obtain because the crystals are fragile and heat sensitive. They must be dried slowly to prevent discoloration and conveyed gently because scraped and broken edges dull their lustre.

To prevent crystal damage during drying, American Smelting & Refining Co. conveyed damp (10% moisture) crystals from centrifuge directly to bagging hoppers. This presented a problem in processing as well as in final product. Crystal's moisture content caused sticking and building up on belt conveyors and formed large lumps when bagged.

Solution: At ASARCO's Perth Amboy, N.J., plant, a horizontal-vertical spiral elevator, conveyor/dryer combination was installed to carry crystals from centrifuge to bagging.

Both conveyors operate on natural frequency principle. Natural frequency units are designed to use heavy duty coil springs as a source of driving energy. This phenomenon is easily explained by observing action of a weight supported by a spring. The weight vibrates at one natural frequency — a natural frequency determined by size of weight and stiffness of spring. If the weight is caused to vibrate on the spring, the spring will act as a power unit, alternately absorbing and giving up energy to weight as it moves through its cycle.

Feature of equipment operating on this principle is the simple, straight forward manner by which a spring can actually be made to do useful work. Conveying action consists of a series of very gentle forward "throws and catches" rather than a series of harsh blows on the material. The long stroke, low frequency vibrating cycle was especially selected due to very fragile nature of nickel sulfate crystals.

Practical advantages of this design are low input horsepower, and uniformly distributed drive stresses since input energy is divided equally between coil springs. Power requirements for horizontal conveyor is 1 hp; for spiral elevator, 3 hp.

Horizontal conveyor, 24" wide, 10' long with 8"-high sides, is used as a dryer. A fine wire screen forms a conveying deck 6" above bottom for the full length of trough. As the nickel sulphate gently vibrates across this deck, warm drying air is circulated up through screen and dries crystals as they move to spiral elevator.

Batches (150-lb) of moist crystals enter conveyor through a bottom-slotted hopper across screen deck. They vibrate across dryer in a steady 1"-deep agitated bed, at a forward speed of 4 ft/min. With crystals exposing all facets in their agitated condition, warm drying air reduces surface moisture to less than 2%. Fines entrained with product crystals pass through screen and are conveyed along the trough to a separate discharge for re-processing.

Crystals discharge from dryer to bottom of vibrating spiral elevator which elevates dried material 10' to bagging machine's feed hopper.

Spiral consists of an 18"-diameter center tube on which is wound a 12"-wide flight with 1'-rise per turn. Entire spiral is set on a natural frequency spring base and vibrates with a lifting-twisting motion gently elevating crystals to bagging hopper.

The 10-ft high spiral elevator is actually equivalent to 80 linear ft of conveyor since each turn of the helical trough is 8 ft long. This unique design results in a 16 minute retention time in less than 30 sq ft of floor area, completing the crystal drying



Spiral elevator, using natural frequency principle of operation, elevates nickel sulfate crystals 10' to bagging machine's feed hopper

without auxiliary air.

Results: Conveyors' gentle handling creates no fines and doesn't dull lustre of crystals. Through use of this special drying equipment, which uses no hoods, crystals are free-flowing when bagged, their appearance has been improved, and production increased because less recycle is necessary. Resultant crystal moisture is less than 2%.

Natural frequency principle, by which screen and spiral conveyors operate, reduces stress in vibrating parts to a minimum. In almost four years, no mechanical maintenance has been required.

(Natural frequency conveyors are manufactured by Carrier Conveyor Corp., Dept. CP, 211 N. Jackson St., Louisville, Ky. . . or for more information check 5193 on form opposite last page.)

Belt conveyor idlers

Bulletin of eight pages describes manufacturer's line of belt conveyor idlers including troughing, flat, self-aligning, and rubber disc and return designs. Construction, sizes, dimensions, and weights are also covered. Bul 119 — The C.O. Bartlett & Snow Co., Cleveland 5, Ohio . . . or for more information check 5194 opposite last page.



...here's "manpower" that hands you a bonus!

Think how many of your plant's handling jobs can be accomplished with much less effort—swiftly and profitably —by one operator "teamed up" with a powerful Towmotor fork lift truck!

You get an entirely new concept of modern mass-handling. You get a "bonus" in extra profits because you multiply manpower with the payroll you have. And you get a bonus in plant-wide morale when work flows on-schedule through every department . . . effortlessly . . . with a bigger day's work done.

Called the "ideal" fork lift truck by management and operators alike, the latest Towmotor models offer exclusive features as advanced as these, at no extra cost:

- New-concept functional engineering
- Simplified dual-entry compartment
- Full-traction weight distribution

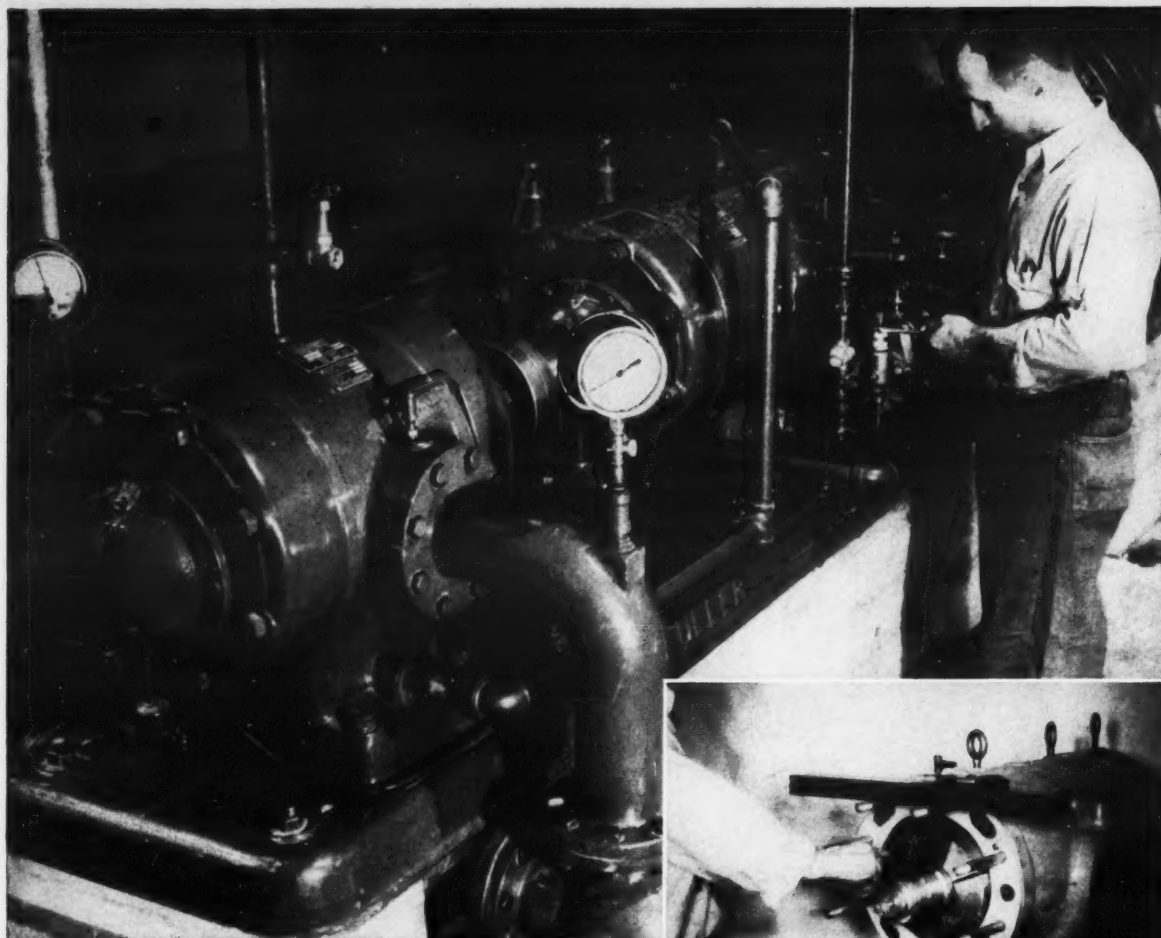
- Adjustable off-center visibility
 - New motion-studied centralized control
 - Towmotor improved precision steering
- Power steering, 'TowmoTorque' Drive at extra cost. These and 60 other points of superiority are described in Towmotor booklet SP-23 for comparison. Get a copy from Towmotor Corporation, Cleveland 10, Ohio.

Leaders for 38 years
in building Fork Lift
Trucks and Tractors



Gerlinger Carrier Co., Dallas, Oregon, is a subsidiary of Towmotor Corporation, Cleveland, Ohio

When inquiring check 5195 opposite last page



PERFECT COMBINATION OF MEN AND MACHINES

Providing plant air for varied uses imposes heavy responsibility on both the compressor and its operator to keep production moving.

The simplicity of the Fuller Rotary Compressor principle reduces maintenance to an absolute minimum; by the same token, operator's universal pride in Fuller Rotary performance contributes to

longer life of the compressor. Few moving parts and smooth operation limit the operator's work to periodic inspection.

This perfect combination of men and machines is worth investigating, with an eye to economies you, too, can enjoy. Write to Fuller Company, compressor sales department for detailed information.



FULLER COMPANY
136 Bridge St., Catasauqua, Pa.

SUBSIDIARY OF GENERAL AMERICAN TRANSPORTATION CORPORATION
Birmingham • Chicago • Kansas City • Los Angeles • San Francisco • Seattle

C-316
4606

PIONEERS OF HIGH-EFFICIENCY VANE TYPE ROTARY COMPRESSORS SINCE 1930

When inquiring check 5196 opposite last page

MATERIAL HANDLING

Lifts and dumps loads to 400 lb

Can be equipped to handle
drums, boxes, and bags

Uses: Mechanical lifter-dumper handles loads to 400 lb. It can be equipped as a multi-purpose machine with changeable skips for handling drums, barrels, boxes, and bags.

Feature: Machine is reported as being fast, lightweight, and



Lifter-dumper can be equipped
for handling drums, barrels,
boxes, and bags

capable of handling seventy-five 400-lb loads per hour.

Description: Models are made in various sizes to dump at any height ranging from 2 to 8'. Special stationary models are built for dumping at any height required.

Lifter-dumper has standard pushbutton controls and a 1/4-hp motor (3 phase or single phase).

(CESCO Jr. Dumpers are manufactured by Essex Conveyors, Inc., Dept. CP, 165 Franklyn Ave., Nutley 10, N.J. . . . or for more information check 5197 on form opposite last page.)

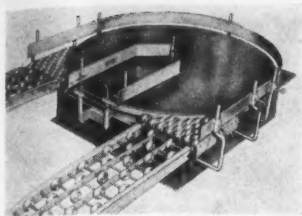
Turns conveyor-loads 90 or 180°

Turntable fits powered or
gravity conveyors

Uses: Turntable is designed for use with powered or gravity conveyors for transferring

CHEMICAL PROCESSING

MATERIAL HANDLING



Turntable takes up only 5 x 5' floor space

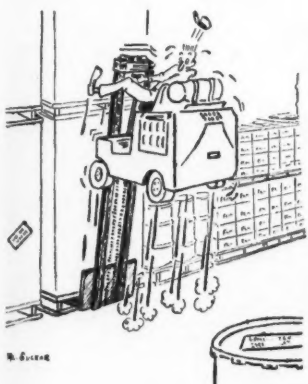
packages or loads at either a 90 or 180° turn.

Features: The 48" diameter disc is driven by gearmotor at 25 rpm. Disc is supported by four rubber-tired ball bearing wheels to insure even top surface under heavy loads.

Description: Turntable contains ball-bearing-wheel feeder sections to assist in transfer from conveyor to disc and back to conveyor. Feeder sections may be placed at any two corners of turntable frame.

Adjustable-height outer and inner guards permit handling packages of varied heights. The turntable requires only 5 x 5' floor space.

(Turntable is manufactured by Samuel Olson Mfg. Co., Inc., Dept. CP, 2418 Bloomingdale Ave., Chicago, Ill. . . . or for more information about manufacturer's product check 5198 on form which is located opposite last page.)



Thanks to A. E. Suckar, Esso Standard Oil Company, Linden, N.J.

ERIEZ PRESENTS THE FEEDER YOU HELPED DESIGN!

Before Eriez engineers designed this new vibratory unit, they went right to the people who use feeders and asked them to list the features they'd want in a feeder. The result is this outstanding vibratory feeder—the most efficient, most dependable unit that engineering skill has yet produced—a feeder based on new concepts in mechanical design and construction materials.

Accurate, controlled feed of bulk materials from ounces to tons per hour—automatically!

For all types of materials

Dry, hot, dusty, lumpy, abrasive, etc. Conveys, spreads, agitates, separates, blends, dries, cools and mixes bulk materials economically and in little space. New, rectangular-shaped tray produces uniform feed without "front end flip" or rear "dead spots." Compact base; feeders can be used in tandem or side-by-side applications. Has firm, stable mounting . . . or can be mounted without the base, directly on a component.

HI-VI's operating principle; no rectifier needed!

Operating at 3600 CPM directly off an AC line, this new feeder needs no rectifier; just plug or wire it in.

The heart of the Eriez HI-VI drive system is a lifetime-powered Alnico V magnet. This magnet replaces the rectifier, in effect, by providing an automatic, inherent magnetic rectification system which is simple, trouble-free and highly efficient. All energy (a two-way push-pull vibrating action) goes for productive performance. Only Eriez vibratory feeders have this exclusive "two way" action!



ERIEZ . . . pioneers and world's largest producer of permanent non-electric magnetic equipment for industry, has three major product lines to serve your needs: **HI-POWR MAGNETIC SEPARATORS**—to remove unwanted iron from processing lines of all kinds. **HI-POWR MAGNETIC AUTOMATION UNITS**—to solve numerous materials handling problems . . . convey, transfer, control, elevate, re-position, etc., ferrous materials or parts during many manufacturing processes. **HI-VI VIBRATORY EQUIPMENT**—Feeders, to move and accurately feed bulk materials; Unit (Bin) Vibrators, to keep bulk materials flowing evenly and smoothly through hoppers, bins, chutes, ducts, etc.

New HI-VI electro-permanent magnetic vibratory feeder has many of the features you asked for: greater output than other units of comparable physical size; totally-enclosed drive element; rust-proof, long-life spring; new design tray for more uniform feed; needs no rectifier!



ENCLOSED DRIVE ELEMENT—NEW SPRING DESIGN—The drive elements for this feeder are completely enclosed—no damage or loss of efficiency due to contamination by moisture or foreign materials. Special disc-shaped springs of bonded glass fiber have replaced the metallic leaf springs found in old-style vibratory equipment. Not subject to corrosion, "packing," fatigue or other critical characteristics of steel leaf spring systems, glass fiber springs will provide many years of dependable, trouble-free performance.

GREATER OUTPUT CAPACITY! Eriez new vibratory feeder has a greater output capacity than other units of comparable physical size . . . gives you higher operating efficiency over broader operating ranges . . . lets you move more materials faster! Higher capacity percentage varies with the particular models in the line.

NOTICE THESE FEATURES, MANY OF THEM EXCLUSIVE!

Totally enclosed drive element • Long-life, disc-type glass fiber spring; can't rust • Greater capacity • Rectangular-shaped tray bottom for more uniform feed • Less sensitive to voltage change • Compact base doesn't interfere with tandem, side-by-side or back-to-back installations • Almost silent operation • Corrosion resistant • Larger, more powerful Alnico V magnet • No "airgap adjustment" needed • Units are lightweight, compact, easily installed • No sliding or rotating parts to wear • Low power consumption, maintenance and operating costs.

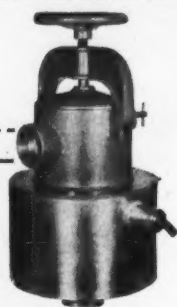
ERIEZ MANUFACTURING COMPANY
73-VV Magnet Drive, Erie, Pa.

Please mail information on the new Hi Vi vibratory equipment to:

NAME _____
COMPANY _____
ADDRESS _____
CITY _____ STATE _____

When inquiring check 5199 opposite last page

If you can't
take the risk
of product
contamination
by iron particles



FERROFILTER

**Electromagnetic
Separators**
will remove that
risk . . . permanently

**WET
FERROFILTERS**

For liquids and slurries of all viscosities. Three types — Gravity, Pipeline (shown) and Underfeed. Various sizes and capacities, to 3" pipe.

**DRY
FERROFILTERS**

For powdered and granular materials. Two sizes. Handle up to 25 tons per hour depending on moisture content, fineness, specific gravity etc.

For full information
Send for BULLETIN 46-E

S. G. FRANTZ CO., Inc.

Brunswick Pike & Kline Ave.
P. O. Box 1138 Trenton 6, N. J.

When inquiring check 5200
opposite last page

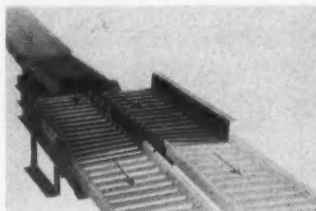
MATERIAL HANDLING

**Separates conveyor loads
as desired**

Unit can be automatically
controlled by many ways

Uses: Separates packages by
various methods as they come
down conveyor line.

Features: Separation can be
controlled by a number of
proved methods: by counting,



Separation is accomplished au-
tomatically without stopping
flow of cartons on conveyor

machine demand, size dif-
ferences, weight differences or
by color code identification.

Description: Packages can be
fed at conveyor speed of 150'
per min. Cases can be end to
end on conveyor line, and sep-
aration is accomplished with-
out stopping flow.

(Auto-diverger is manufac-
tured by Standard Conveyor
Co., Dept. CP, North St. Paul
9, Minn. . . or for more in-
formation check 5201 on
form opposite last page.)

**Telescopic belt conveyor
easily handles bags
from box cars**

Power-driven, mobile units
are in 2, 3 or 4 sections

Uses: Conveying bagged
materials into or out of trail-
ers and box cars.

Features: Telescopic feature
permits conveyor to follow
load in box cars.

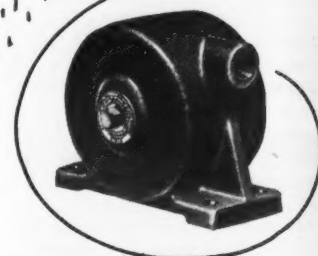
Description: Conveyor is
supplied in 2, 3, or 4 sections.
Each section may be 10, 12, 14,
or 16' long. Belt widths are
10, 20, or 30". Belt on each
section is driven by a sep-
arate motor. Unit telescopes
by power drive.

Differences in level between
loading dock and trailer bed

**EFFECTIVE, ALL-DIRECTIONAL
VIBROLATION**

**MOVES GRANULAR
OR WET MATERIAL
NOISELESSLY**

The simplest, most quiet answer for
moving materials in hoppers, chutes
and bins. One moving part, no lubrica-
tion, no maintenance, never harms the
equipment on which it is mounted. In-
stantly self-starting every time. Vibro-
lator is the only vibrator that can
guarantee this regardless of operating
conditions. Write for catalog. You will
also receive form for describing your
problem. No obligation!



VIBROLATORS®

©Vibrolator is a registered trade
name and applies only to the pat-
ented Peterson Vibrolator.



ENGINEERING COMPANY

155 KEMP ST. NEPONSET, ILL.

When inquiring check 5202 opposite last page

**Neff & Fry Silo
used for calcined coke**

Many of our silos are currently being
erected for handling and storing calcined
coke. Scores of them have been in use for
the same purpose over the years. The
photograph shows one such installation in
Pennsylvania. It is 24 ft. dia. x 60 ft. high.

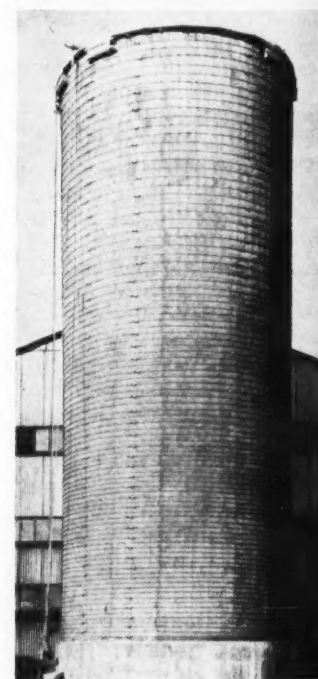
There are a number of special problems
in designing systems for handling calcined
coke and other materials of similar con-
sistency. Our knowledge of the subject
can be of great practical value. We'll be
glad to communicate or confer with you.

Our silos are constructed of Super-Con-
crete Staves with diagonal ends which
permit steel hoops to impinge directly
upon the horizontal joints. As many inter-
vening hoops are installed as needed to
met the lateral thrust of the contents. This
is clearly explained in our folder, "Bins
With the Strength of Pillars." A copy is
yours for the asking.

Not exported except to Canada
and Mexico.

THE NEFF & FRY CO.
166 ELM ST., CAMDEN, OHIO

When inquiring check 5203 opposite last page



**SUPER-
CONCRETE STAVE
STORAGE BINS**

CHEMICAL PROCESSING

DARNELL

Always **SWIVEL**
and **ROLL**

CASTERS AND WHEELS

for maximum
long life, minimum
maintenance



RUBBER TREADS . . . a wide choice of treads suited to all types of floors, including Darnelloprene oil, water and chemical-resistant treads, make Darnell Casters and Wheels highly adapted to rough usage.

RUST-PROOFED . . . by zinc plating, Darnell Casters give longer, care-free life wherever water, steam and corroding chemicals are freely used.

LUBRICATION . . . all swivel and wheel bearings are factory packed with a high quality grease that "stands up" under attack by heat and water. Quick grease-gun lubrication provides easy maintenance.

STRING GUARDS . . . Even though string and ravelings may wind around the hub, these string guards insure easy rolling at all times.



Write for your
free copy of this
important book
today



Consult the yellow pages
of your telephone directory

DARNELL CORPORATION, LTD.
DOWNEY (LOS ANGELES COUNTY) CALIFORNIA
80 WALKER STREET, NEW YORK 13, NEW YORK
36 NORTH CLINTON STREET, CHICAGO 6, ILLINOIS

When inquiring check 5204
opposite last page

MATERIAL HANDLING

are automatically accommodated by pivotal action between sections.

An optional elevating boom, which eliminates lifting, travels from floor to 6' in height. It may be located at either end, and its elevation is controlled by pushbutton.

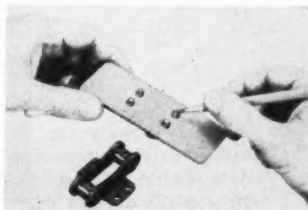
(Belt telescopic conveyor is manufactured by Wilkie Co., Dept. CP, 5520 Arch St., Philadelphia 39, Pa. . . or for more information check 5205 on form which is located opposite last page.)

**Nylon top plates fasten
to steel roller chain
to form conveyor**

Plates fasten securely without use of rivets

Uses: Conveying cans, bottles, packages, small parts.

Features: Combination of nylon and steel gives conveyor wear-resistance advantages of all-nylon chain plus strength to carry heavy loads without stretching.



In conveyor assembly, each nylon top plate secures to roller chain without use of rivets

Description: Conveyor consists of nylon top plates assembled on either heat-treated carbon steel or stainless steel chain. Four projections molded onto underside of each nylon plate become self-rivets for fastening to roller chain.

Two sizes of top plates are available — either 3 3/4 or 4 1/2" by 1-7/16". Chain's pitch is 1 1/2".

(Ny-Steel flat-top roller chain is manufactured by Link-Belt Co., Dept. CP, Prudential Plaza, Chicago 1, Ill. . . or for more information check 5206 on form which is located opposite last page.)



PICK-UP PACK... ONE-TON SIZE



CORRUGATED AND SOLID FIBRE BOXES
FOLDING CARTONS • KRAFT PAPER AND SPECIALTIES
KRAFT BAGS AND SACKS

Each of these Drumpak corrugated containers holds 2000 lbs. of bulk granular chemicals. This same amount was formerly packed in 20 hundred-pound units. By consolidating his product in Drumpaks, this manufacturer reduced handling manhours by 80%. The Drumpak is easy to pick up, warehouse and load into freight cars.

Drumpaks are another Gaylord development. To learn how you can cut costs with any type of corrugated or solid fibre container, contact your nearby Gaylord office.

AVAILABLE FOR SHOWING, WITHOUT COST — NEW FIFTEEN MINUTE SOUND SLIDE FILM ON THE ECONOMIES OF USING CORRUGATED BOXES FOR BULK SHIPMENTS.

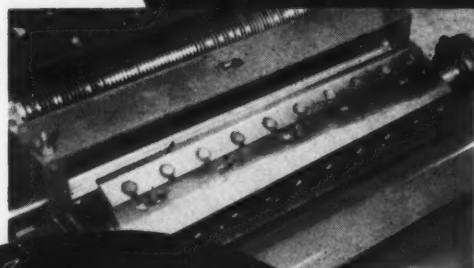
GAYLORD CONTAINER CORPORATION • ST. LOUIS

DIVISION OF CROWN ZELLERBACH CORPORATION

When inquiring check 5207 opposite last page

TAYLOR-STILES PRECISION CUTTERS

CUT TO ACCURATE LENGTHS



A—Rotating element, with four fly knives. Available in 1, 2, 4 or 6 fly knives.

B—Bed knife.

C—Bed knife adjusting screw.

D—Bottom feed roll, stationary as far as up and down travel is concerned, adjustable to follow movement of bed knife.

E—Top feed roll, slides up and down against spring pressure.

F—Breaking down roll, for stock that must be compressed so feed roll (E) can grab it.

G—Feed Apron. The difference in level between the feed apron and the bottom feed roll depends on type material to be cut.

Taylor-Stiles Precision Type Cutters cut plastic and rubber sheets and rods into uniformly sized pellets. They cut continuous fibre into accurate lengths and thread waste into accurate sections. They cut many other products to precise size. The feed rolls hold the stock firmly close to the cutting edge, while the knives are synchronized to give the exact length of cut desired.

These precision cutters are available in a whole series of light, medium and heavy duty models.

Write us today for illustrated folder No. 212. "Taylor-Stiles Precision Type Cutters" for the full story, mentioning also the type of material you must cut.

TAYLOR-STILES & CO.

20 Bridge Street

Riegelsville, N. J.



MAIL COUPON TODAY FOR FREE FOLDER.

Taylor, Stiles & Co.
20 Bridge Street
Riegelsville, N. J.

Gentlemen:

Send me your folder No. 212 fully describing and illustrating your Precision Type Cutters.

Type of material we want to cut

Name Company

Street

City State

When inquiring check 5208 opposite last page

MATERIAL HANDLING

Truck-mounted carriage with hydraulically operated forks handles detachable containers. With all controls at his fingertips . . .

driver never leaves cab to



Truck-mounted assembly is designed for high dumping and short turning and maneuvering areas

Uses: Picking up, hauling, and dumping manufacturer's detachable containers (in sizes to 21 cu yd) when handling bulk materials.

Features: Pickup assembly, somewhat resembling that of a standard fork truck, is completely operable without driver leaving cab — hydraulic controls are right at his fingertips. Small turning and maneuvering area requirements plus high dumping (from a maximum height of 11') are other features of this model.

Description: In pickup position, height of assembly is less than 9½'. Combined overall length of truck chassis and assembly in this position is less than 22'.

In hauling position, assembly tilts forward for better load distribution. Height in this position is 9', while combined length is 21'.

In dumping position, extended height is 23', with clearance under forks to 11'.

Containers are picked up by forks engaging pins on each side of container. Forks are controlled from cab, eliminating necessity of attaching lifting chains or cables.

Once container is locked into position, it is held securely until operation is completed. Container must be released by driver, as an automatic lock prevents its being released at any time during dumping.

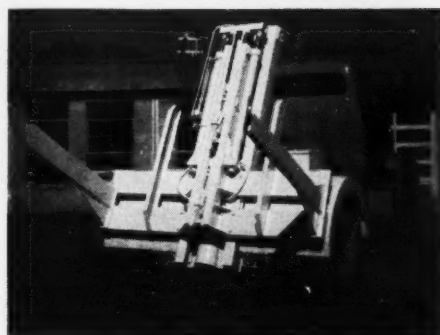
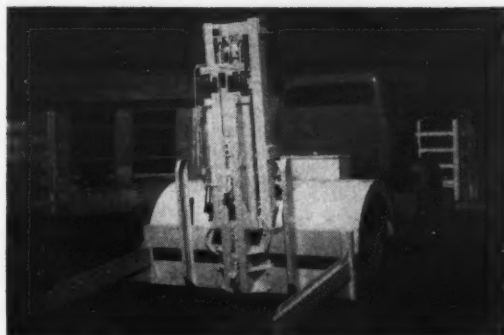
Unit handles many types of manufacturer's detachable containers, including "Drop Bottom", "Universal" and "Tilt Type."

(Type GRD, Model 304-F-2 Dempster-Dumpster is manufactured by Dempster Brothers, Inc., Dept. CP, Knoxville 17, Tenn. Check 5209 on form opposite last page.)

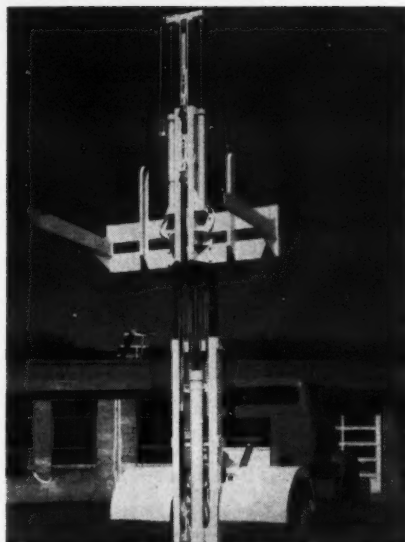
CHEMICAL PROCESSING

s cab to pick up or dump
large bulk containers

Pickup . . .



Carrying . . .



. . . Dumping — are
all controlled without
driver ever leaving
cab

AJAX LO-VEYORS

are cutting costs



AJAX Open Pan Lo-Veyor

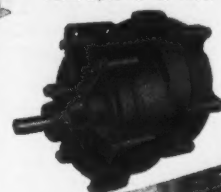
in
Large Plants
in Small Plants

Plant layout men know that materials flow lines are never a static affair. That's why more and more AJAX LO-VEYORS are being used to give maximum flexibility to operations in large plants and small plants, indoors and outdoors.

AJAX LO-VEYORS are compact, self-contained units that can be suspended from ceilings, along walls, under or at floor levels, giving maximum flow capacity in limited space. They can be quickly and easily installed and or relocated with a minimum of cost and production down time.

AJAX LO-VEYORS in open and closed pan and tubular types meet every requirement of tonnage, speed, sanitation, abrasive and explosive conditions.

Write the factory TODAY for Bulletin No. 39 and name of your nearby AJAX Representative.



AJAX Shaler-Shaker Drive



AJAX Closed Pan Lo-Veyor



AJAX Tubular Lo-Veyor

AJAX FLEXIBLE COUPLING CO. INC.
WESTFIELD, N. Y.

When inquiring check 5210 opposite last page



HARRISBURG GAS CYLINDERS

cost less in the long run



In design and manufacture of Harrisburg Seamless Steel Cylinders for high pressure gases, *durability* is a prime consideration. It was Harrisburg that set the high standards many years ago that have caused industry to expect twenty-five years or more of useful service from gas cylinders.

Price is only one factor in the cost of a cylinder. Price divided by the number of years of expected life is the real measure of cylinder values. On that basis Harrisburg offers the best possible buy. This Company makes a complete range of sizes and capacities, to I.C.C. Specifications, in Export and Domestic types.



More than a century in Harrisburg

Harrisburg Steel Co.

Send for prices and complete information.

Division of
HARSCO CORPORATION

**HARRISBURG 24
PENNSYLVANIA**

When inquiring check 5211 opposite last page



**LIGHT
BUT SO STRONG!**

**TOTELINE
FIBERGLASS
TRAYS**

**For Drying:
CHEMICALS
PHARMACEUTICALS
ANTIBIOTICS**

They're feather-light, but they're durable and sturdy as any trays you've ever used! What's more, the large inside corner radii makes them very easy to clean. And, because fiberglass does not absorb heat, the materials dry faster in Toteline trays. Many sizes available. Write

TOTELINE
Wherever
materials
are handled

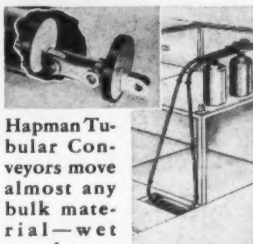
MOLDED FIBERGLASS TRAY CO.
World's largest producer of Fiberglass reinforced resin trays, wire bases
LINESVILLE, PENNSYLVANIA

When inquiring check 5212 opposite last page

HERE'S HELP
THAT SOLVES TROUBLESOME
BULK HANDLING PROBLEMS:

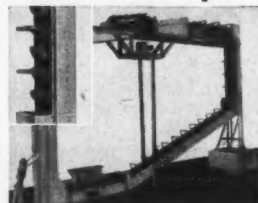
Hapman

Tubular and Pivoted Bucket Conveyors



Hapman Tubular Conveyors move almost any bulk material—wet or dry—through any plane or angle. They're dust, liquid and odor-tight. Investigate!

WRITE for Bulletin T-C87



Exclusive top loading device on Pivoted Bucket Carrier handles fragile materials gently. Many other unique advantages.

WRITE for Bulletin P-C87

Hapman CONVEYORS, INC.
DIVISION HAPMAN-DUTTON COMPANY
KALAMAZOO MICHIGAN
In British Commonwealth & Europe: Fisher and Ludlow Ltd., Birmingham

When inquiring check 5213 opposite last page

MATERIAL HANDLING

Heavy-duty fork trucks

Series of three two-page bulletins present detailed information on performance, dimensions, weight, and electrical and mechanical features of heavy-duty fork trucks. Bults 530, 730, and 830 — Mercury Mfg. Co., Dept. CP, 4044 S. Halsted St., Chicago 9, Ill. Check 5215.

Lightweight hand truck easily, safely handles loads to 1000 lb

Has movable forks for easy tilting, brakes for ramps

Uses: Moving bags of materials stored on pallets.

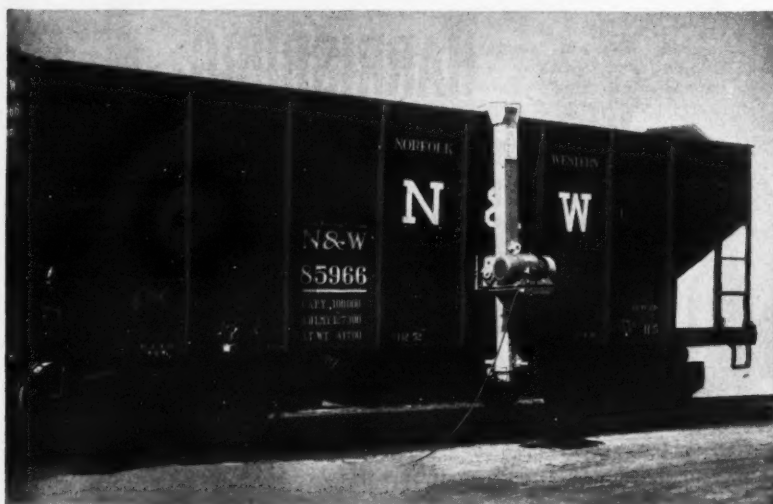
Features: Hand truck is available with hand brakes for safe movement of heavy loads down ramps. Safe tipping of heavy loads (to 1000 lb) is design feature which calls for truck's frame to be



Hand truck is available with hand brakes for movement of heavy loads down ramps

in contact with load at all times. When load is tilted to an almost 45° angle, it reaches a balance point where load will actually rest without operator touching truck.

Description: Truck has movable shoe for easy picking up or setting down of loads. For picking up, shoe is flat on ground while truck-frame remains at an angle greater than 90°. When forks are under load and when frame is pushed forward against load, shoe automatically locks at



The NATIONAL CAR SHAKER

was developed to meet a demand for a low cost means of unloading material from hopper bottom cars. It will cut your labor costs up to 80%, keep your men out of railroad cars, and speed up your unloading operations.

NATIONAL CONVEYOR & SUPPLY COMPANY
357 N. Harding Ave., Chicago 24, Ill.

When inquiring check 5214 opposite last page

UNLOAD

Coal, Coke, Sulfur,
Ores, Sand, Stone,
Limestone, Cinders,
And Other Bulk
Materials.

WRITE TODAY

trucks

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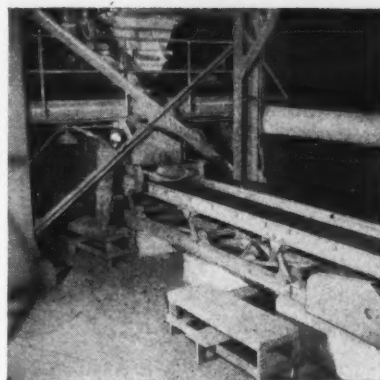


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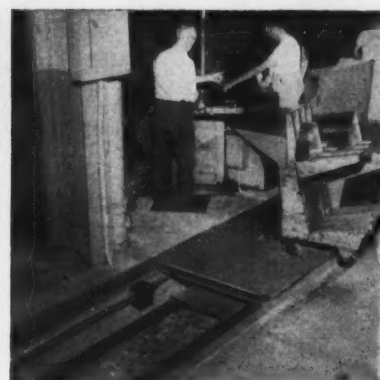
For smooth, surge-free flow of materials ... choose LINK-BELT Oscillating Conveyors



PELLETIZED IRON ORE is discharged from furnace to 36-in. wide Link-Belt Torqmount oscillating conveyor. This heavy-duty conveyor is for capacities to 100 tph and over.



DAMP, STICKY ROOFING GRANULES flow smoothly from mixer to dryer on this Flex-mount oscillating conveyor. "Positive Action" oscillation assures continuous, uniform flow.



GLASS CUTTINGS from car and truck windows are handled efficiently and safely by space-saving, under-floor oscillating conveyor. Metal troughs resist abrasive wear.

Heavy-duty transfer bin sets up in 2 seconds

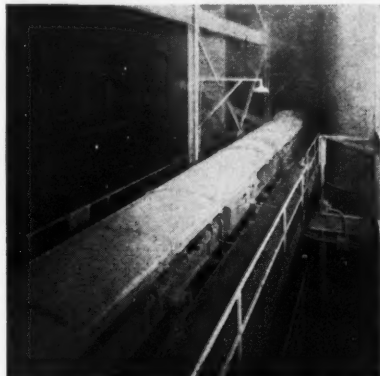
Polyethylene liners available

Uses: In-plant handling of bulk materials.

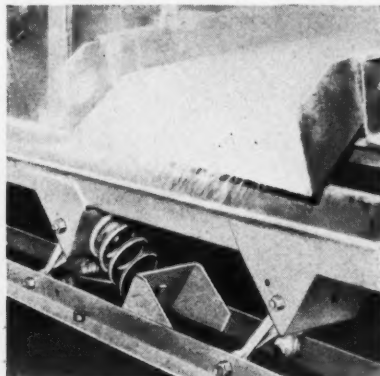
Features: Box can be collapsed for saving storage space. It can be set up in two seconds without use of stitching, stapling, or taping. Polyethylene liners are available for handling wet, oily, or corrosive materials.

Description: Units are available in two sizes — 17 x 13 x 14½" and 15 x 12 x 10". Covers are supplied for dust-free storage.

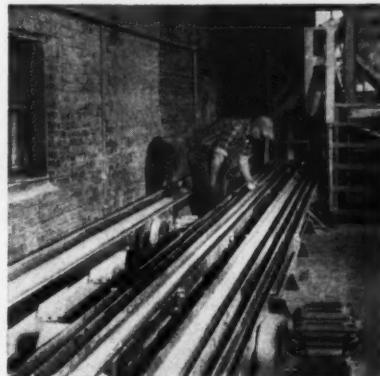
(Miracle Transfer Box is manufactured by The Paige Co., Dept. CP, 114 E. 32nd St., New York 16, N.Y. . . . or check 5217 opp. last page.)



CRUSHED CALCIUM CARBIDE—as hot as 1700° F—is no problem for Torqmount oscillating conveyor at this plant. It's enclosed to confine dust, prevent entrance of moisture.



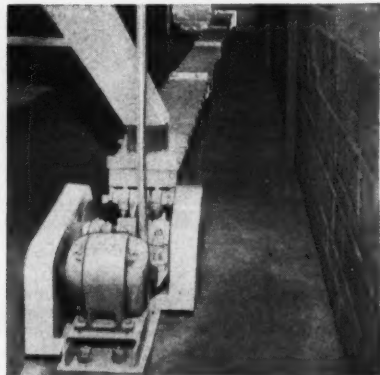
LIMESTONE and other materials containing dust or lumps the width of the conveyor trough are handled with minimum power demand on Coilmount conveyors.



THREE GRADES OF SALT are carried simultaneously by each of two partitioned Link-Belt Flexmounts. Deep, one-piece metal troughs are leak-proof . . . prevent spillage.



BAUXITE SINTER up to 300° F is carried on 36-in. wide heavy-duty oscillating conveyors from coolers to silos at 105 tph. Conveyors are spring mounted, dynamically balanced.



CORN PRODUCTS at a food plant are warmed as they travel in these insulated conveyor troughs. Self-cleaning troughs aid sanitation . . . prevent material buildup.

Sharp abrasives to delicate flakes . . . sticky granules to free-flowing powders—these hard-to-handle materials and many more are carried effectively on Link-Belt oscillating conveyors. Their positive action smooths out surges—assures uniform, continuous feed even under sudden overloads. It's combined with natural frequency to minimize power requirements.

Your nearest Link-Belt office can give you full details. Or write for Book 2644 on Coilmount and Book 2444 featuring Torqmount and Flexmount types.

14, 634

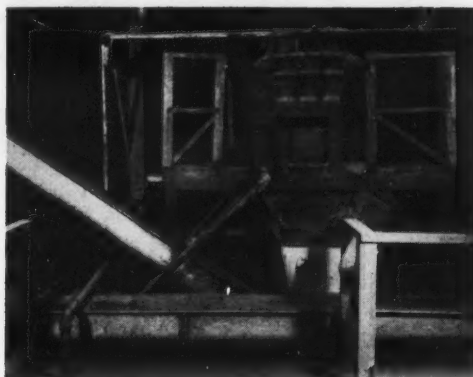
LINK-BELT
OSCILLATING CONVEYORS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville (Sydney), N.S.W.; South Africa, Springs. Representatives Throughout the World.

When inquiring check 5218 opposite last page



by conveyor belts



by spiral conveyors

**If you
move
materials**

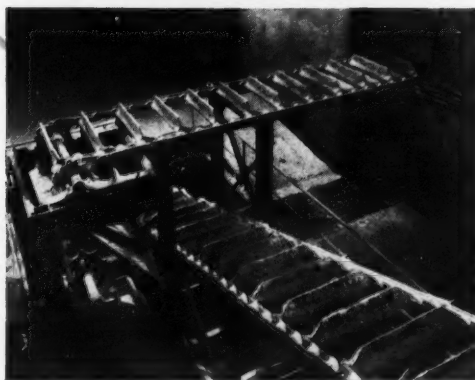
JEFFREY offers you

equipment incorporating the know-how gained in three-quarters of a century of studying and solving material-handling problems. Today, in thousands of plants throughout the world, Jeffrey conveying equipment is depended upon to maintain high production schedules, lighten the burden of labor and reduce operating costs.

Write for Catalog 860 describing Jeffrey material-handling and processing equipment. For high quality parts matching those originally installed on your equipment, get in touch with a nearby Jeffrey distributor or The Jeffrey Manufacturing Company, Columbus 16, Ohio.



by bucket elevators



by scraper conveyors



JEFFREY

CONVEYING • PROCESSING • MINING EQUIPMENT
TRANSMISSION MACHINERY • CONTRACT MANUFACTURING

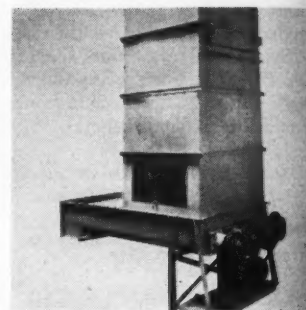
MATERIAL HANDLING

Accurately discharges fluffy materials

Bell-shaped hopper has live-bottom discharge

Uses: Accurate weighing and thorough discharging of fluffy or sticky materials such as long asbestos fibers, and rubber crumbs.

Features: Weigh hopper has three bell-shaped sides, one straight side, permitting un-



Bell-shaped hopper allows accurate weighing, thorough discharge of sticky materials

restricted flow. Variable pitch screw feeder provides "live bottom" discharge from hopper.

Description: Unit is enclosed for dust-proof operation, with operating levers outside weighing chamber. It is suspended from a set of beams and terminates in a dial head. Hopper can be fed from bucket elevator, screw feeders or other conveyors.

Discharge can be manually (with pushbutton) or automatically operated with mercury magnetic cutoff. Optional equipment includes automatic printer, remote indicating equipment, and automatic totalizing counters.

Hopper is available in capacities from 50 to 5000 lb.

(Weigh hopper is manufactured by Richardson Scale Co., Dept. CP, Van Houten Ave., Clifton, N.J. Check 5220 opposite last page.)

For more information on product at right, specify 5221 . . . see information request blank opposite last page.

When inquiring check 5219 opposite last page

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ESSING

THE all-new CLARKLIFT CY 40



A single truck with dual performance

Now for the first time, a single truck meets any terrain condition. On paved surfaces, the *Clarklift CY 40*, with *single standard tires*, is fast and maneuverable. Now change to *dual wide-profile tires*. This *same truck* now operates over mud or rough terrain with powerful traction, high stability and flotation.

As standard equipment, there's fingertip-control power shifting, and a creeper range for rough ground and steep grades. Power steering insures matchless handling ease. Even weight distribution means positive traction and gradeability.

This new 4000-lb *Clarklift* sets a new pace, regardless of conditions. Try a demonstration on your own property. Your Clark dealer will arrange it. He's listed in the Yellow Pages.

Industrial Truck Division
Clark Equipment Company
Battle Creek, Michigan

CLARKLIFT is a trademark of Clark Equipment Company

CLARK®
EQUIPMENT

**Can you "pay for"
a magazine like this?
with a \$3.00 or \$5.00
subscription?**

This magazine costs more than \$40.00 per year

Maybe you've thought publishers make money on a \$3.00 or a \$5.00 subscription . . . and that is why they ask you to subscribe.

No, it's not true . . . your \$3.00 or \$5.00 fall far short of "paying" for any really good business magazine.

The costs of printing, paper and postage alone usually exceed subscription prices. Editorial costs and other expenses run to many times that amount. And usually it costs more just to sell such subscriptions than they bring the publisher in dollars. So, the publisher actually "loses money" on such sales.

Then, why? . . . yes, *why* do some publishers charge a nominal rate for a subscription . . . but other publishers send their magazines without charge?

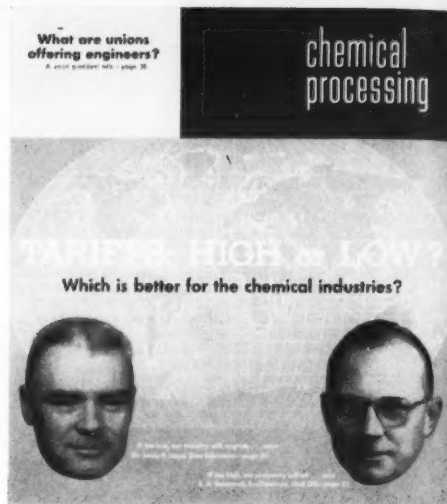
Well, the "paid-subscription" magazine gets a lower postage rate than does the "non-paid subscription" magazine. Some publishers feel this postal advantage is important. So they charge a "token fee" as a subscription price. And so win a lower postage rate.

But—whether you pay nothing, or such a "token fee," you—the reader—do not *really* pay for the magazine's service.

No — advertisers pay the bills . . . and so, logically, advertisers *demand* the best possible coverage of the important, key men of the field. That means folks like you, who exercise buying power.

CHEMICAL PROCESSING "handpicks" its readers—for best, effective circulation . . . and sends the magazine to these key folks, without charge.

You see, you simply can't get maximum coverage of important folks by trying to force them to buy subscriptions. Such men, limited in numbers, are scattered all over the U.S.A.; travel and/or direct mail cost money; a large share "forget to renew" each year; and, no matter how much time, money and pressure you put on them, there are always some important men who will never buy.



You don't "pay"—still CHEMICAL PROCESSING gets better circulation. So, as you can see, a subscription price is at best but a "token payment." You don't really pay for any magazine with \$3.00 or \$5.00.

But, CHEMICAL PROCESSING gets the best, most effective circulation coverage by "hand-picking" the right readers. This gives values to advertisers which they can't possibly get in any other way.

That's why . . . CHEMICAL PROCESSING handpicks only qualified readers . . . The Management Team in chemical processing plants . . . presidents, partners, plant managers, foremen, engineers, chemists, directors of research, etc. Then the editors make the magazine so interesting, so valuable, these folks *want* to read it.*

That's why CHEMICAL PROCESSING spends many thousands of dollars on each issue — to give you this service costing more than \$40.00 per year . . . without charge . . . as *you* are an important reader in the chemical field.

No, you can't "pay for" any good business magazine with \$3.00 or \$5.00. Whether you receive a "paid magazine" or a "non-paid magazine" you are still enjoying a valuable service — whose cost is far above any price you paid for a subscription.

**Every issue proves this qualified readership . . . by unequalled response from these key readers. May we show you the evidence?*

Chemical Processing



published by: Putman Publishing Company
also publishers of:

FOOD PROCESSING
INDUSTRY POWER
FOOD BUSINESS



"Executive Magazines for Industry"

**THE
all-new
CLARKLIP
CY 40**

Like hav

There are four combinations of steer tires that make this versatile truck you can have four trucks instead of one fits a different job.

Dual wide-profile tires and pressure give extra traction apply when overall maximum standard and single standard surfaces.



THE
all-new
CLARKLIFT
CY 40

Like having four trucks instead of one

There are four combinations of same-size drive and tires that make this Clarklift CY 40 the most versatile truck you can buy. Think of it—it's like having four trucks instead of one. Each set of tires is designed for a different job.

Dual wide-profile tires (shown above) at 30 pounds per square inch give extra traction. *Single wide-profile tires* are used when overall machine width is limited. *Dual standard* and *single standard tires* apply on firmer surfaces.

Each tire combination mounts without machine modifications, thus change-outs are readily made according to the job. Clark alone offers the new high flotation wide-profile tires as standard equipment. Ask your Clark dealer about them and the new Clarklift CY 40, the truck that's really four trucks in one.

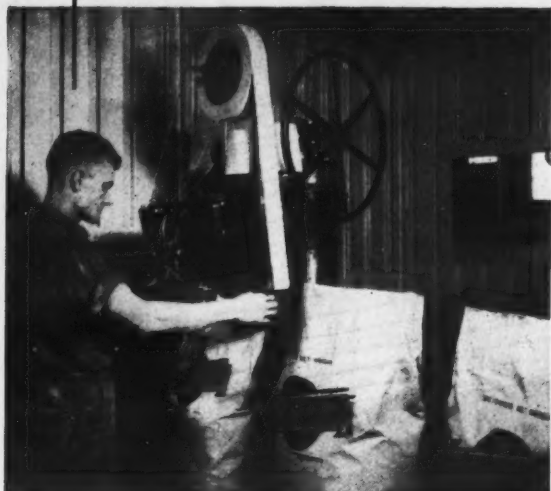
Industrial Truck Division
Clark Equipment Company
Battle Creek 9, Michigan
Clarklift is a trademark of Clark Equipment Company



For more information on product at left, specify 5222 see information request blank opposite last page.



Bag Closing Machines for Every Need . . .



...from *Union Special's*
Complete Line! . . .

FOR lower production costs . . . stronger, neater closures . . . ability to get out rush orders in a hurry, you can't beat Union Special Bag Closing Machines! Specially built to stand up under heavy production schedules, these machines provide the high output rates needed to meet modern competitive conditions.

In the Union Special line, it's easy to find the right unit to meet your particular requirements: 25 different styles of machines! 7 styles of sewing heads! For any kind and size of bag—paper, cotton, burlap, or jute. ASK FOR RECOMMENDATIONS. Illustrated Bulletin 200 will be sent on request.

Ask for Recommendations

UNION SPECIAL MACHINE CO.
442 N. Franklin Street, Chicago 10, Ill.

Gentlemen: Without obligating me, please furnish information on bag closing equipment to handle the following production:

Kind of bags used? _____
Filled weight of bag? _____
Material being packed? _____
Maximum number of bags per minute? _____
Check-weighing required after filling? _____
Conveyor required on Bag Closing Machine? _____
Power: ☐ D.C., ☐ A.C., Volts _____ Phase _____ Cycles _____
Name _____
Company _____
Address _____

When inquiring check 5223 opposite last page



PACKAGING



Eastman Chemical is now shipping acetate, butyrate, and polyethylene plastics in specially built bulk trailer. Material is pneumatically unloaded from one of three separate compartments to customer's storage tanks

Flex-O-Glass, Inc., Chicago, receives butyrate cubes in specially built three-hopper truck trailer. Pneumatic unloading, minimized storage space, and bulk handling are all part of plan for . . .

shipping plastics in bulk — a savings to customers



At Flex-O-Glass, Chicago, butyrate cubes from center hopper of bulk trailer being pneumatically unloaded through 6-in flexible hose. Air is from blower mounted on forward end of trailer. Average unloading time for one compartment is 2 hr

Flex-O-Glass, Inc., Chicago, Ill., is able to realize savings in handling plastic from manufacturer through a shipping plan recently inaugurated. Manufacturer, Eastman Chemical Products, is making available bulk shipments of acetate, butyrate, and polyethylene plastics by trailer truck. Upon arrival at the Flex-O-Glass plant, butyrate in cube form is pneumatically unloaded from trailer to storage tanks by utilizing a self-contained 25-hp blower mounted on forward end of trailer.

Unloading is accomplished through 40-ft flexible hose, 6 inches in diameter. Hose consists of two 20-ft sections which are carried on the truck. Sections are quickly connected to filling line by spring-loaded ratchet. To receive the material, Flex-O-

Glass has each with Transfer processing are conveyor, term is bei

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customer labor and to handle ments (a made, un tically u mized sto use of la bins; and to proces gravity, c facilitated age equip

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When inquiring check 5223 opposite last page

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Glass has two aluminum silos, each with capacity of 35,000 lb. Transfer from storage to processing area is now by screw conveyor, but pneumatic system is being considered.

In preparing to offer this plan to its customers, Eastman had a bulk trailer specially built consisting of three airtight compartments (or hoppers), each with a capacity of 7000 to 10,000 lb (depending on type of material being shipped). With this truck, three different materials can be shipped at one time. Any one of the three can be unloaded from its particular compartment as desired. Average unloading time per compartment is two hours.

To handle shipments by the bulk trailer method, Eastman recommends that customers have storage tanks of approximately 1000 cu ft each. Tanks may be installed in either outdoor or indoor areas, but should be located so that delivery line from unloading area does not exceed 100 ft.

Plan affords savings to the customer through reduction of labor and equipment needed to handle other types of shipments (after connections are made, unloading can go practically unattended); minimized storage space through use of large silos, tanks, or bins; and transfer of material to processing area by air, gravity, or mechanical means facilitated by use of bulk storage equipment.

(Tenite plastics are manufactured by Eastman Chemical Products, Inc., sub. of Eastman Kodak Co., Dept. CP, Kingsport, Tenn. Check 5224.)

(Bulk tank trailer was manufactured by Trailmobile, Inc., Dept. CP, Robertson & Thomas Aves., Cincinnati, Ohio . . . or check 5225 opp. last page.)

Details case sealer

Automatic sealing machine for end-of-the-line case sealing is detailed in two-page bulletin. Case sealing machine bul — Schroeder Machines Corporation, Dept. CP, East Syracuse, N.Y. Check 5226.



Because Vulcan stocks the widest selection of Hi-Bake lined pails possible, manufacturers of chemicals, foods, drugs, oils, fertilizers, paints, varnishes and other hard-to-hold products have turned to Vulcan. They find Vulcan's years of experience coupled with constant field and laboratory research invaluable in solving their lining problems.

Do what so many others have done . . . bring your lining problems to Vulcan first. Let Vulcan's chemists lining-test your product. They will develop a Hi-Bake lining that will meet your most rigid specifications . . . one that will protect and maintain the quality and uniformity of your product. It will pay you in time and money saved.

Samples gladly supplied on request. Call or write today.



Over 40 years Container Experience

VULCAN
CONTAINERS INC.

Bellwood, Illinois
(Chicago Suburb)
Phone Linden 4-5000

In Canada:
Vulcan Containers Ltd.
Toronto 15, Ontario

Representatives in all
principal cities
See "Pails" in Classified
Phone Directories

When inquiring check 5227 opposite last page

skyhooks to liners

Now—get greater protection and more rugged service from your drum and package liners. Specify VISQUEEN "L" Film—a special polyethylene developed for Operation Skyhook.

Unique, new production processes make VISQUEEN "L" Film stronger, tougher, and as pinhole free as a polyethylene film can be. VISQUEEN "L" Film is the perfect economical liner material for shipping corrosives, acids and adhesives.

Write for samples and see why.

Important! VISQUEEN Film is all polyethylene, but not all polyethylene is VISQUEEN. Only VISQUEEN film has the benefit of research and resources of VISKING Company.

balloon film sample request

VisQueen
Trade Mark

clip this tag,
attach to letterhead and mail

CP8-1410

PLASTICS DIVISION
VISKING COMPANY
P.O. Box 1410 Terre Haute, Indiana
In Canada: VISKING LIMITED, Lindsay, Ontario.

Division of



Corporation

When inquiring check 5228 opposite last page

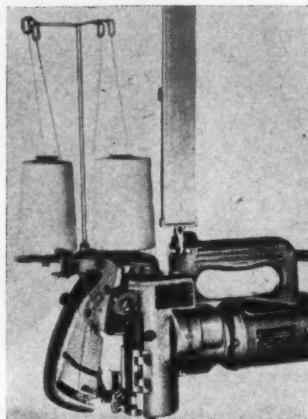
PACKAGING

**Hand sewing machine
handles intermittent
bag closing**

Machine weighs 10½ lb,
thread feeds from top

Uses: Closing bags made of
cotton, burlap, jute, multiwall
paper, and laminated paper.

Features: Weighing 10½ lb,
machine is designed for use in



Halter around operator's neck
steadies machine while operator
closes bags

limited or intermittent opera-
tions. It can deliver two types
of stitch — 401 or 101.

Description: Unit is
equipped with halter which
operator wears around his
neck. This enables him to hold
it steady during operation. If
bench operation is desired,
pedestal bracket can be sup-
plied.

(Class 2100 electric bag closer
is manufactured by Union
Special Machine Co., Dept.
CP, 400 N. Franklin St., Chi-
cago 10, Ill. . . or for more
information check 5229 on
form opposite last page.)

Self-adhesive labels

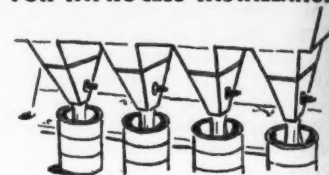
Data sheet of two pages de-
scribes and illustrates self-
sticking labels which take pen,
pencil, ball point, or type-
written information. Data sheet
132-1 — W. H. Brady Co.,
Dept. CP, 727 W. Glendale
Ave., Milwaukee 9, Wis. Check
5230.

**DON'T GET
Hung-up
THERE IS A
Cleveland Vibrator**

**FOR INCOMING RAW
MATERIALS**



FOR INPROCESS INSTALLATION



FOR PACKAGING



and for all other bin applications
in the handling of dry or viscous
chemicals. Prevents bridging,
plugging and arching — keeps
chemicals moving — eliminates
processing delays.

**Write today for literature and
engineering details.**

Air or Electric

Portable or Permanent

Silent or Standard



2706 Clinton Avenue • Cleveland 13, Ohio

When inquiring check 5231
opposite last page

CHEMICAL PROCESSING

Low press
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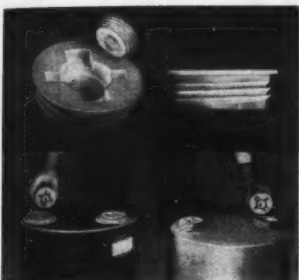
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Check 5

AUGU

**Low pressure PE closures
are now standard
on PE drums**

Low pressure polyethylene closures for molded polyethylene drums have become standard on manufacturer's 15, 30, and 55 gallon drums.

The closure is designed for eliminating possibility of damage to flange and threads; facilitating filling and emptying; and extending life of



Low pressure polyethylene closures are standard on 15, 30, and 55 gal drums

drum by allowing simple replacement of plug.

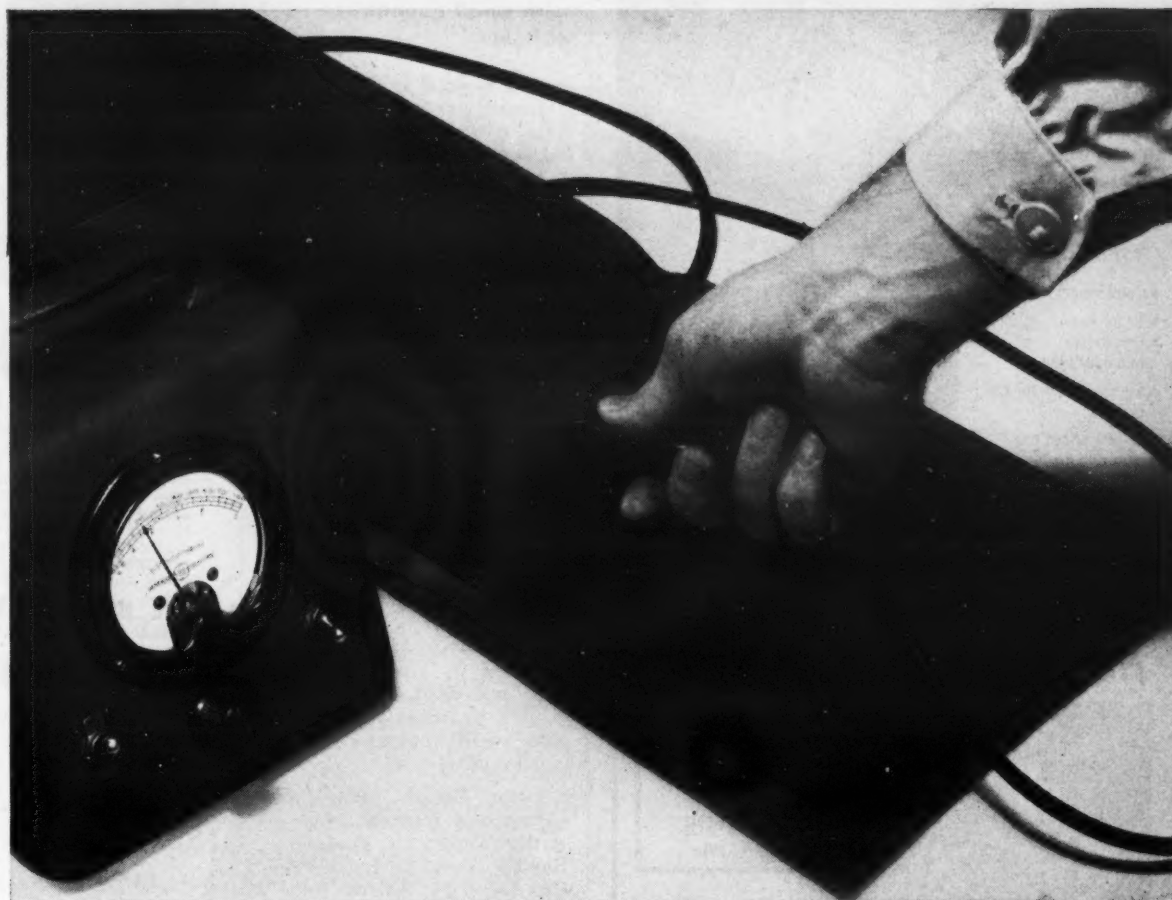
Basically, design-change features two identical flanges with heavy duty internal buttress threads. Each flange takes a 2" plug fitted with a pliable polyethylene gasket to insure a leakproof seal. Plug is molded with $\frac{3}{4}$ -in standard pipe threads in center for spigots, valves, or pipes.

(Polyethylene drums with closures are manufactured by Delaware Barrel & Drum Co., Dept. CP, PO Box 1648, Wilmington, Del. . . or for more information check 5232 on the convenient Reader Service slip opposite last page.)

Cut bulk container costs

Nine ways to save on packing and shipping costs by using corrugated bulk containers are discussed in four-page bulletin. Case histories illustrating successful uses are included. "How To Cut Costs With Corrugated Bulk Containers" — Gaylord Container Corp., Div. of Crown Zellerbach Corp., Dept. CP, St. Louis 2, Mo. Check 5233.

Not a thin spot anywhere!



Rheem engineers check uniformity of linings with super-sensitive film thickness gage.

New Rheem Centrifugal Spray Process gives you a completely uniform lining...drum after drum after drum!

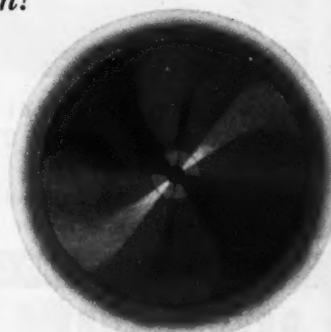
It's been checked out again and again in Rheem laboratories. It's been proved time after time on rough and tumble test-trips in the field.

When a drum lining is applied by the new Rheem Centrifugal Spray Process, all surface areas are—and stay—completely and uniformly coated! And that goes for any new Rheem drum lining you put under the gage too. For this new process is so fully automatic, linings can't vary from one drum to the next, one day to the next.

Indeed, Centrifugal Spraying is a vast improvement over all other lining methods. It uses no air, thus eliminating grease, dust, and dirt—a major problem with linings applied by the conventional system.

It eliminates pinholes and blisters. It eliminates chance for human error. And Centrifugal Spraying—teamed with the new Rheem vertical oven—makes possible a curing job never before equaled!

Remember—only the new Rheem Centrifugal Spray Process gives you: (1) Uniform lining thickness—controlled to within .1 of a mil. (2) Uniform viscosity of lining materials with lower solvent content. (3) Uniform application. There's no air turbulence because there's no air used in the spray and no drum rotation. Spray always travels the same distance to coat all surfaces. (4) Uniform curing—thanks to vertical, 3-stage ovens with controlled air flow and temperatures.



New Centrifugal Sprayer spins off a continuous curtain of finely atomized lining material at a controlled, uniform rate.

YOU CAN RELY ON



WORLD'S LARGEST MAKER OF STEEL SHIPPING CONTAINERS

For full details write: Rheem Manufacturing Co.
Container Division, 1701 Edgar Road, Linden, N. J.

Plants and Sales Offices: Richmond and South Gate, Calif. • Chicago • Linden, N.J. • New York • Houston • New Orleans • Sparrows Pt., Md

When inquiring check 5234 opposite last page

FISCHBEIN Portable BAG CLOSER

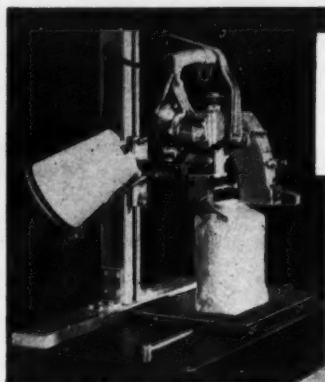
HANDLES ALL TYPES OF BAGS!

- Total weight: 10½ lbs.
- Requires no installation . . . plug into any outlet
- Simple to operate and maintain
- Lowest priced bag closer on market

FULLY GUARANTEED!

OPTIONAL SUSPENSION
UNIT ADAPTS MACHINE
TO STATIONARY USE

NEW! FOR CLOSING SMALL BAGS!



FISCHBEIN
TABLE MODEL
CARRIAGE
CONVEYOR
(Model FS)

One simple knob locks any Fischbein Portable Bag Closer into proper sewing position. Carriage slides freely and returns automatically to starting position, ready for next bag.

UNIQUE VERSATILITY! Any Fischbein Bag Closer can be used 3 different ways!

1. Completely portable
2. Suspended with counterbalance
3. On carriage conveyor for closing small bags

FOR DETAILS, MAIL THIS COUPON TODAY!

DAVE FISCHBEIN CO., DEPT. 9B
2730 30th Ave. S., Minneapolis 6, Minn., U.S.A.

Name _____
Firm Name _____
Address _____
City _____ Zone _____ State _____

When inquiring check 5235 opposite last page

PACKAGING

Unit fills small containers with small quantities of liquid

Can handle up to 40 containers per minute

Uses: Filling glass or plastic bottles, jars, and cans with liquids ranging from alcohol to cream oil consistencies. Machine can be bench-mounted or set on top of barrel or container for quick operation.

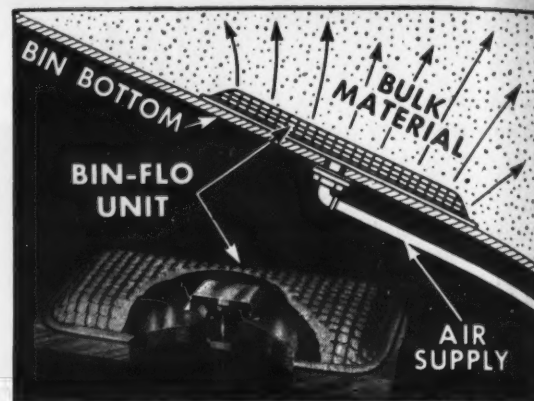
Features: Metering cylinder and valve assembly include adjustable suck-back control that permits high-speed volumetric filling to accuracies with one percent variation. Maximum rate is 40 containers per minute.

Description: Machine is single-metering cylinder and single-nozzle design having total fill capacity of 8 fluid ounces. It is powered with gearhead motor. Amount of liquid delivery per stroke is adjusted by changing stroke of crank mechanism. Operation is by manual control at side which operates single-revolution clutch.

("Little Giant" filling machines are manufactured by Arthur Colton Co., Division of Snyder Tool & Engineering Co., Dept. CP, 3400 E. Lafayette, Detroit 7, Mich. . . or for more information check 5236 on form which is located opposite last page.)



"This don't look like no ivory tower to me..."



BIN-FLO

USES SMALL VOLUME OF AIR AT LOW PRESSURE

KEEPS BULK MATERIALS MOVING

BIN-FLO units in bins, chutes, hoppers, etc., restore flow characteristics to dry, finely ground materials which tend to pack or bridge in storage. Types for all materials and conditions. No moving parts; simple installation; negligible operating cost; no maintenance cost.

BIN-DICATOR the original diaphragm-type bin level indicator. In successful use for over 20 years. **ROTO-BIN-DICATOR** new, motor-driven paddle type; excellent on bins under pressure or vacuum, and for general application. Also explosion-proof units, U.L. listed.

THE BIN-DICATOR CO.

13946-D Kercheval • Detroit 15, Mich.

Write for detailed literature or call

Valley 2-6952

WE SELL DIRECT • PHONE ORDERS COLLECT

When inquiring check 5237 opposite last page



"What's A New Solution?"

It's an article in **CHEMICAL PROCESSING** describing a new way of solving a tough plant operating problem. In each issue you will find specific "case histories" showing how these processing problems were solved. Each article states the operating problem . . . explains the process used and gives details of how problem was solved . . . shows results secured.

Take a look at "New Solutions" articles in this issue — they might suggest a "solution" for some of your tough processing problems.

Reynolds
in corrugated
with PE

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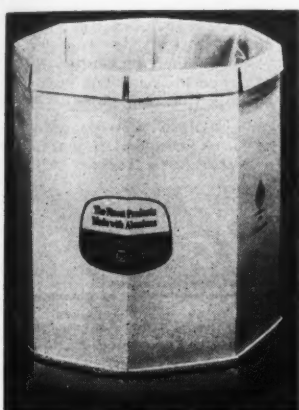
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PACKAGING

Reynolds ships alumina in corrugated drum with PE liner

Results are lower-cost, one-trip package

Problem: How to get substantial cost reductions in packaging and shipping activated alumina and still use a container that will prevent the alumina from absorbing water from atmosphere?



Corrugated drum with PE bag is used for shipping 400 lb activated alumina

Solution: Reynolds Metals Co., Bauxite, Ark., changed to an octagonal corrugated container used in conjunction with 3-mil polyethylene bag. Each drum holds 400 lb.

Polyethylene liner acts as vapor barrier to keep alumina from absorbing moisture from atmospheres.

Results: Reynolds has realized lower initial package costs and benefits in receiving and warehousing knocked-down containers.

Corrugated drum makes only one trip and is disposed by customer. This eliminates deposit charged on previous containers.

(Corrugated drum is manufactured by Gaylord Container Corp., Div. of Crown Zellerbach Corp., Dept. CP, 111 N. Fourth St., St. Louis, Mo. . . or for more information check 5238 on the convenient Reader Service slip which is located opposite last page.)

"Another product safely shipped in Inland 'protection' containers"

A brief case history . . . with a perfect finish

"And they were happy ever after"



Funny way to start a story? Not when the story begins with a finish. In this case, it's a fine leather finish made by Newark Leather Finish Co. It's used by tanners to add color, durability and water repellency to the leather that goes into your shoes . . . your billfold . . . your brief case.

A long time ago, Newark discovered that it was impossible to package their product in ordinary steel containers because of corrosion difficulties that impaired the quality of their product. Then, Inland Steel container special-

**the right container, with the right lining for your product*

ists went to work and developed a custom-made lining that would keep Newark leather finish completely free from contamination in transit and during storage. Result: a successful finish and an end to Newark's packaging problems.

Want to write a finish to your packaging problems? Just contact Inland Steel Container. Once you see what Inland can do for you, you'll agree with Hans Haemisegger (Chief Chemist of Newark Leather Finish Co.) who says, "Inland is the finest drum made." Write Bob Boecher, Dept. 333C.

Full line of steel and stainless steel shipping containers, including galvanized and heavy duty ICC drums.

INLAND STEEL CONTAINER COMPANY

Division of Inland Steel Company • 6532 S. Menard Avenue • Chicago 32, Ill. • Plants: Chicago, Jersey City, New Orleans, Cleveland and Greenville, Ohio.



"It's Better to Ship in Steel"

When inquiring check 5239 opposite last page

Fast, Dependable Accuracy FOR YOUR WEIGHING OPERATIONS—



MODEL 1120
FLOOR PLATFORM

**EXACT
WEIGHT**

**PREDETERMINED
WEIGHT SCALES**

(Over and Under Type)

**Accurate weight
in out-of-level
position**

FOR CHECKWEIGHING BAGS — Short lever fall with adjustable hydraulic damping mechanism assures speed and accuracy. Easy-to-read dial on tilted tower. Dial indication provides 2 inches of travel, equivalent to 16 ounces over and under. Model shown above is 100-lb. capacity; others available to meet any requirements.



FOR PRODUCTION OPERATIONS

MODEL 213

Dial and platters positioned in direct range of operator's vision for uninterrupted flow of production. Magnified fractional ounce indication. Available in straight tower or slant tower. Capacity: 3 lbs.



Sales and Service Coast to Coast



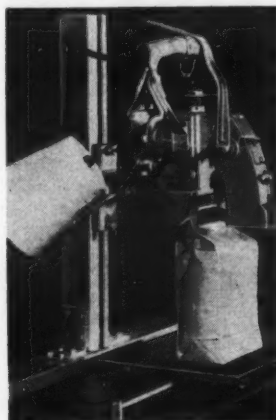
THE EXACT WEIGHT SCALE CO.
905 W. FIFTH AVE., COLUMBUS 8, OHIO
In Canada: P.O. Box 179, Station S, Toronto 18, Ont.
BETTER QUALITY CONTROL . . . BETTER COST CONTROL

When inquiring check 5240 opposite last page

PACKAGING

**Carriage conveyor makes
portable bag closer
for line operation**

Uses: Carriage conveyor is designed to hold portable sewing machine to give economical means for fast, easy closing of small bags.



Portable bag closer is locked into position on carriage conveyor by one knob

Features: With complete unit, line-operation is possible. Sewing machine can be removed instantly.

Description: Portable bag closer is locked into proper position by turning one knob. Operator guides bag through sewing operation which is controlled by foot switch. Carriage glides on ball-bearing rollers and returns automatically to starting position, ready for next bag.

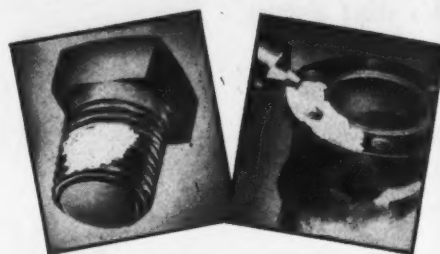
Adjustable for varying bag sizes, unit accommodates 2½-lb cones of thread.

(Portable bag closer with carriage conveyor is manufactured by Dave Fischbein Co., Dept. CP, 2720 30th Ave., South, Minneapolis, Minn. . . or check 5241 opp. last page.)

Steel drum specs

Complete specifications for manufacturer's line of steel drums are listed in four-page folder. Steel drum folder — Steel Drum Div., National Steel Container Corp., Dept. CP, 6700 S. LeClaire Ave., Chicago 38, Ill. Check 5242.

THE ANSWER TO THOSE DIFFICULT LEAKING-JOINT PROBLEMS!



The tough, clinging film of Leak Lock stretches rather than breaks

Leak Lock has the ability to hold chemical solutions and gases that would eat through ordinary joint compounds. It has extraordinary adhesion and remains flexible indefinitely.

During the past seven years, Leak Lock has found its place in the chemical, petroleum, atomic energy, electronic, refrigeration and many other industries in constantly increasing uses for special purposes and as the answer to many "unsolvable" joint problems.

If you have a leaking joint problem, write on your business letterhead for Leak Lock sample. Highside Chemicals Incorporated, 16 Colfax Ave., Clifton, N.J.

Leak Lock

When inquiring check 5243 opposite last page

MATCHED to your needs



**SURETY INDUSTRIAL
GLOVES**

PROVEN more wear per pair



Just the right gloves, for the jobs to which you subject hands, are as important as the right production machinery. By supplying gloves with proper hand comfort and assured safety you improve valuable workers' satisfaction.

Natural Rubber, Neoprene, Sureseal (HYCAR), Vinyl and all types of Coated . . .

Surety makes many regular and special types of gloves for most requirements and can supply accurate information, as to wearing qualities and resistance that will help you select the right gloves for your jobs and control glove costs. Send for a Surety catalog.

THE

SURETY

In Canada:
Safety Supply Co., Toronto

**RUBBER CO.
CARROLLTON, OHIO**

When inquiring check 5244 opposite last page

CHEMICAL PROCESSING

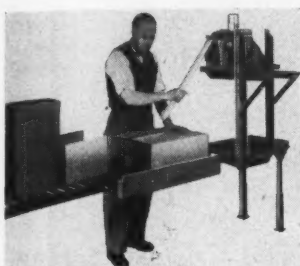
**Automatically feeds
correct lengths
of tape**

Unit is used for sealing different size boxes

Uses: Measuring, moistening, and delivering correct lengths of gummed tape for sealing cartons.

Features: Unit is particularly useful to shippers sealing different size cartons.

Description: As cartons come down conveyor line, operator pushes them against measur-



Unit automatically measures and feeds correct lengths of gummed tape

ing device. Device automatically tells dispenser what length of gummed tape is needed for that particular carton. At same time, device causes dispenser to deliver this correct length of moistened tape.

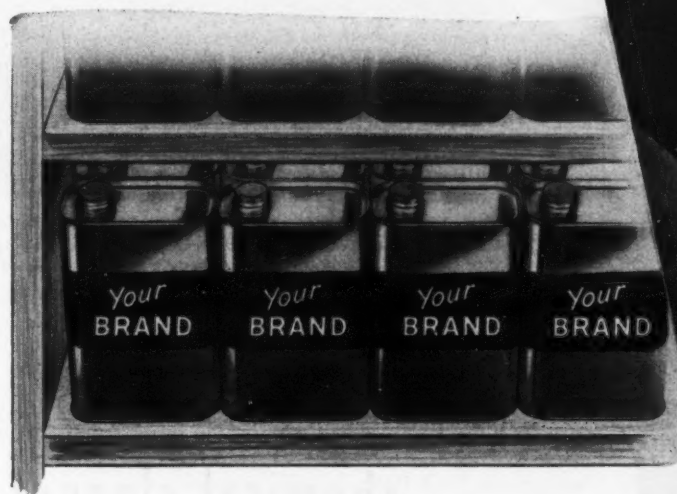
Operator then applies tape to carton and continues it on its way.

(Boxize Tape-O-Matic is manufactured by Better Packages, Inc., Dept. CP, Shelton, Conn. . . . or for more information check 5245 on form opposite last page.)

Overseas air shipments

Handy, six-page reference guide lists import requirements of 168 foreign nations. Specific consular documents, charges, and exact phraseology required for shipments to virtually any spot in the world can be quickly determined. Import Requirements Brochure — Air Express International Corp., Dept. CP, 90 Broad St., New York 4, N.Y. Check 5246.

Get better display for your name with Continental "F" style cans



...and save valuable shelf space, too!

The broad flat surface of every "F" style can acts just like a poster for your product. The handsome lithography of Continental's master craftsmen quickly identifies your product in the eyes of busy shoppers . . . makes your product more attractive, easier to see, easier to sell. And because of the space-saving rectangular shape, "F" style cans let grocers stock *more* of your product per shelf foot.

Let us start you off with all the "F" style cans you need. Sizes four ounce (spout top) up to one gallon. Then, if you need engineering or research help for any phase of your operation call us. It's available as part of our special package service. Order soon . . . get the packages with more "see", more "sell" — Continental "F" style cans. Rapid delivery from shipping points across the U. S.



**CONTINENTAL
CAN COMPANY**

Eastern Division: 100 East 42nd Street, New York 17, New York
Central Division: 135 South LaSalle Street, Chicago 3, Illinois
Pacific Division: Russ Building, San Francisco 4, California

When inquiring check 5247 opposite last page

**"KERODEX" protected
hands wash clean
without scrubbing.**



"KERODEX" spreads on like a cream but acts like an invisible glove to shield the skin from the vast majority of industrial irritants such as acids, alkalis, solvents, paints, cutting oils, and resins. "KERODEX" does not smear. It does not affect materials handled, nor is it affected by them. Two types of "KERODEX" are available for "wet" and "dry" work. Write for full information on "KERODEX" barrier creams to Ayerst Laboratories, 22 East 40th Street, New York 16, N. Y.

5759

When inquiring check 5248 opposite last page

IF YOU USE THESE PRODUCTS

send for
the world's most
complete, illustrated
catalog of
**ELECTRIC
LANTERNS**
and
**SAFETY
CANS**

VALUABLE DATA:

The world's first comprehensive table
of lamp and battery operating
information
High power searchlights
All-purpose hand lights
Safety lights and lanterns
Flammable liquid SAFETY CANS
Oil Waste Cans

JUSTRITE Mfg. Co.

2061 N. Southport, Chicago, Ill.

CATALOG NUMBER 569-S8

When inquiring check 5249 opposite last page



SAFETY



At another plant than Swift's, method for introducing sulfamic acid solutions into equipment is being demonstrated. Water flowing toward tank car sucks dry acid out of drum through specially-designed probe and eductor

Swift and Company uses sulfamic acid instead of muriatic
to remove water scale. This do-it-yourself . . .

chemical cleaner is safer and easier-to-handle

WILLIAM C. CLARKE, Assistant Editor
ROBERT C. JONES, Assistant Superintendent
Technical Products Plant
Swift and Company Hammond, Indiana

Problem: Acid corrosion was occurring on stainless steel tubes when muriatic acid was used for cleaning. Operators were using muriatic acid, plus inhibitor, at Technical Products Plant, of Swift and Company, to remove water scale from condensers.

This corrosion problem caused Swift's maintenance engineers to be on the lookout for any improved method for removing water scale.

Solution: Upon an experimental basis, Swift and Company began using a sulfamic acid solution, 3 to 5 percent strength at 140°F, to clean water side of stainless steel tube condensers. Within a short time, Swift also began using the acid for cleaning black-iron equipment.

Based on a policy of preventive maintenance, Swift periodically cleans hot water heaters, glycerine evaporators, and equipment used for condensing propane gas with sulfamic acid solution. Cleaning job on water side of condensers usually requires two to eight hours with sulfamic acid, a slightly longer time than with muriatic. Heaters are cleaned in two to four hours.

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Because sulfamic acid is received in a dry form and diluted to requirements, cleaner is easier to handle than muriatic. In addition, problem of broken carboys and spilled liquids is eliminated. Sulfamic is also less injurious to skin and clothing than mineral acids are. Yet scale is removed readily by solutions of the acid.

Swift's method of using sulfamic acid is relatively simple. pH paper is used as control. Sufficient sulfamic acid, plus inhibitor, is added to cleaning water to arrive at pH of approximately 1. Acid picks up a greenish or yellowish cast as it works. Solution is recirculated until pH reaches five to six and is then "dumped". Swift has also found that sulfamic will not touch organic films or rust. Acid will remove rust only if it is integral part of scale build-up.

Results: During the two years sulfamic acid has been used at Swift, it has been found to be safe and easy-to-handle. Tube corrosion from cleaning has been greatly reduced. A thorough job of cleaning is being done. It has been found that sulfamic acid removes calcium, magnesium, sodium, and other carbonates without formation of gas pockets. Cleaning action of sulfamic acid appears to be very uniform.

(Sulfamic acid is product of E. I. du Pont de Nemours & Co., (Inc.), Dept. CP, Wilmington 98, Delaware. Check 5250 opposite last page.)



"Will you two quit arguing about whose suit it is, . . . just go get the fire out!"



Chempump eliminates fire hazard handling acetone and naphtha at Vi-Jon Laboratories

This *Chempump* moves a highly inflammable mixture of acetone and naphtha in the manufacture of chemical specialties and cosmetics at Vi-Jon Laboratories' St. Louis plant. The conventional pump it replaced leaked continually at the packing gland, creating a fire hazard. The leakproof *Chempump* solved this serious problem.

For Vi-Jon Laboratories, *Chempump* means maintenance economy as well as safety. The company reports there has been absolutely no maintenance on the pump. "It was installed and forgotten, as far as maintenance is concerned."

With *Chempump*, hard-to-handle fluids can't leak—in or out—because there are no seals, no stuffing box, no packing. Occasional inspection and replacement of bearings is the only care required. External lubrication is never needed—bearings are constantly lubricated by the pumped fluid itself.

Leakproof fluid handling with *Chempump* offers many other advantages well worth your investigation. For details, write to Chempump Corporation, 1300 East Mermaid Lane, Philadelphia 18, Pa. Engineering representatives in over 30 principal cities in the United States and Canada.



Chempump combines pump and motor in a single, leak-proof unit. No shaft sealing device required.

U.L. approved. Available in a wide choice of materials and head-capacity ranges for handling fluids at temperatures to 1000 F. and pressures to 5000 psi.

Chempump

First in the field...process proved

When inquiring check 5251 opposite last page

FACTORY MUTUAL APPROVED FOR THE ULTIMATE IN SAFETY

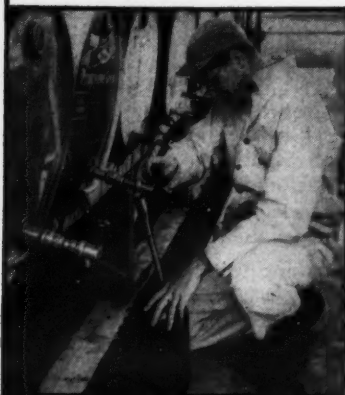
NEW

**CHEMICAL
FAUCET FOR
FLAMMABLE
AND
CORROSIVE
FLUIDS**



FUME TIGHT STAINLESS STEEL[†] FAUCET OVERCOMES SEIZURE PROBLEMS

Here is a faucet designed for minimum maintenance and the ultimate in safety for dispensing solvents, essential oils, chlorine-free bleaches, oxidizing agents, caustic solutions and many acids. They are in use in individual and central dispensing systems in laboratory, production and liquid storage areas throughout the chemical process industries.



Liquid dispensing at an Eastman Kodak storage area. More than 200 solvent storage drums are equipped with Economy chemical faucets.

LOOK AT THESE FEATURES:

- **NO AFTER DRIP** — Kel-F "O" ring seals are inert to chemical exposure.
- **DESIGNED FOR SAFETY** — Anti-flash screen prevents flame propagation in dispensing flammable liquids.
- **EASILY CLEANED** — Disassembled in minutes, the faucet can be chemically and/or steam sterilized.
- **LOW MAINTENANCE** — Corrosion resistance with few moving parts assures long life.
- **FACTORY MUTUAL APPROVED** — Your assurance of quality construction and safe operation.

Write for complete information including detailed test report by Factory Mutual Laboratories.

[†]Also available in chrome-plated brass [†]M. W. Kellogg trademark for fluorocarbon resin

ECO ENGINEERING DIVISION
economy FAUCET CO.
12 NEW YORK AVE.
NEWARK 1, NEW JERSEY

When inquiring check 5252 opposite last page

SAFETY



CHEMICAL PROCESSING wins safety award for third consecutive year

For the third year in a row, CHEMICAL PROCESSING magazine has been presented National Safety Council's Public Service Award for "Exceptional Service to Safety." The award was presented in recognition of articles and stories CHEMICAL PROCESSING published in 1956, concerning safety methods and practices in chemical processing industries.

Shown accepting the award from National Safety Council Representative K. A. Kelsen (second from right) are CP Publisher Russell L. Putman (left), Assistant Editor George Michael, and Editor John C. Vaaler (right).

Acid leak indicating tape prevents 'hot' liquid equipment damage

Can also be used to cover plastic piping systems

Uses: As indicating tape for wrapping acid and caustic transport pipe lines.

Features: Material is also recommended for "hot" liquid transport area where leakage could damage equipment. Can be used to cover plastic pipe systems known to split due to vibration.

Description: Tape is made

of glass fiber with vinyl covering and coated with patented indicator. Acid lines are covered with red-colored indicator that turns yellow when triggered by leaking acid. White-colored tape is used for caustic lines. Leakage of caustic liquid turns tape purple. Tape is covered by thin protective coating to prevent triggering by fumes or climatic conditions.

(Indicating tape is available from Neirad Industries, Inc., Dept. CP, PO Box 865, One Post Rd., Darien, Conn. . . or for more information check 5253 on form located opposite last page.)



Red indicating tape turns yellow if acid leak occurs in line

Describes fire detector

Bulletin of four pages describes hermetically-sealed fire detector units which operate on rate-compensation principle developed by manufacturer. Physical and electrical specifications are listed. Mounting suggestions and temperature settings for various models are included. Bul MC-107B — Fenwal Inc., Dept. CP, Ashland, Mass. Check 5254.

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SAFETY

**Constant, gentle air supply
when worker is at rest
or under exertion**

Breathing equipment does
not depend on ambient air

Uses: For supplying fresh
air to workmen in industries
having hazardous respiratory
operations.

Features: Equipment main-
tains gentle positive pressure
in mask, not noticeable to
wearer, whether he is resting
or under extreme exertion.
Since it is not dependent on
ambient air as source, or on
blowers, entrance of contami-
nants is eliminated.

Description: Breathing pro-
tection equipment supplies
pure, fresh, filtered air to
workman from high pressure
air cylinders. Air from cylin-
ders is reduced in pressure by
reducing valve. Before reach-
ing mask, air passes through
regulator, brain of the unit.

Available air supply is vis-



Small diameter hose of breath-
ing protection equipment en-
ables work to be performed in
comfort and safety 250' or more
from source of air

ible at two check points. It is
shown on pressure gage at
cylinders and also can be seen
by workman on gage attached
to harness. Armored hose, en-
ables personnel to perform
work in safety and comfort
250' or more from source of
air.

(Pressure Demand Air-Pak
is product of Scott Aviation
Corp., Dept. CP, 242 Erie St.,
Lancaster, N.Y. Check 5255.)

CESCO...RIGHT—BEFORE YOUR EYES!



545-W Welder's
Cup-type Goggles



401-7H CESCO
Hat 'n' Shield



401-7F Fiber Glass
Welding Helmet



410
Helmet
for cramped quarters



548-W Welder's
cover goggles

NEW Ratchet-adjusting, tough plastic headgear for helmets & face shields



CESCO #438-FT Face Shield is
strong, rugged, light-weight and
easily tilted off the face. It is con-
structed of translucent fiber glass
material.

New CESCO G1-R Headgear for
welding helmets and face shields.
Adjusts to any head size with a few
quick turns of the ratchet.

• The new CESCO G1-R Headgear permits quick, easy and
comfortable fitting. It adjusts to the required head size by a mere turn or two
of the adjusting ratchet.

The new headgear is constructed of exceptionally long-wearing high-
impact vinyl compound. It is impervious to perspiration or chemical action
and is easily cleaned.

This headgear is now available on all CESCO welding helmets and
face shields. It is illustrated here with the new CESCO #438-FT Face Shield.

CHICAGO EYE SHIELD COMPANY • 2719 West Roscoe Street, Chicago 18, Illinois
OFFICES IN: Atlanta, Baton Rouge, Birmingham, Boston, Buffalo, Cincinnati, Cleveland,
Columbus, Dallas, Denver, Detroit, Houston, Kansas City, Knoxville, Little Rock,
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Milwaukee, Montreal, Orange, Peoria,
Philadelphia, Pittsburgh, Salt Lake City,
San Mateo, Spokane, St. Louis,
St. Paul, Toledo, Tulsa

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and name of your
nearest CESCO distributor

CESCO



FOR SAFETY

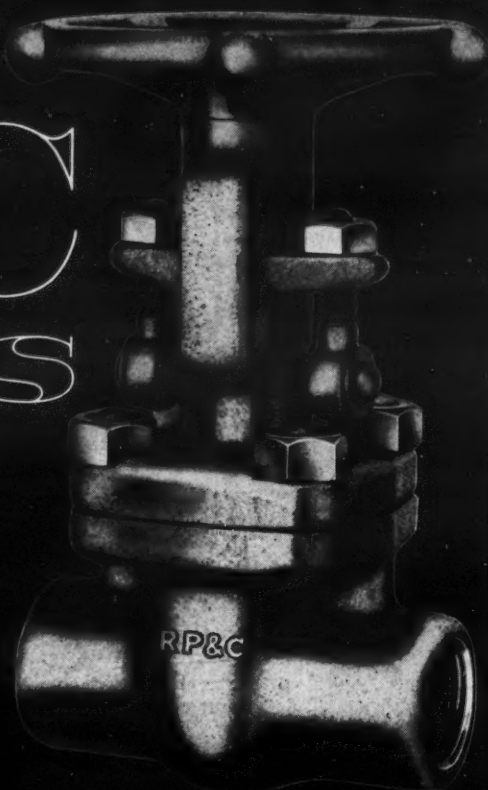
When inquiring check 5256 opposite last page

ACCO
for Better
Values

THE COMPLETE LINE—

R-P&C VALVES

DESIGNED FOR DEPENDABILITY



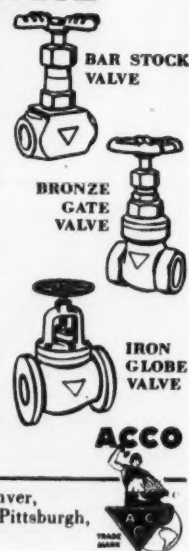
R-P&C FORGED STEEL GATE VALVES ARE NOW IMPROVED TO GIVE EVEN BETTER SERVICE

R-P&C Forged Steel Gate Valves, developed specially for the power, petro-chemical and process industries, are now better than ever. These dependable valves have been improved for greater safety, better performance and longer service life.

Illustrated above is a general purpose valve of the 800 Series; it is rated at 2500 PSI at 100° F., or 800 PSI at 850° F., and is furnished in eight sizes from ¼" to 2". It is available with either screw (F-56) end or socket weld (F-57) end, and with conventional and full port openings. Also available in flanged ends with conventional port openings in 150, 300 and 600 lb. with A.S.A. standard flanges and A.S.A. standard face to face. For details, write for Booklet DH-80.

The R-P&C Line is Complete

Whatever your valve requirements may be, look first to your R-P&C Distributor. The R-P&C Valve line includes gate, globe, angle and check valves in all standard valve materials—bronze, electric iron and cast steel, as well as the forged steel line described above. An exceptionally wide range of styles, sizes and pressure classes is available. In addition, R-P&C offers a full line of cast steel fittings, also specialties such as asbestos-packed cocks, bar stock valves, Lubrotite gate valves and other items. Order through your R-P&C Distributor. For complete R-P&C catalog, write our Reading office.



FREE WALL CHART

"How to Protect Your Valves"

Installation pointers, operating tips, clues to longer valve life. They are all on this 22" x 17" wall chart. Write for your free copy.

R-P&C VALVE DIVISION AMERICAN CHAIN & CABLE

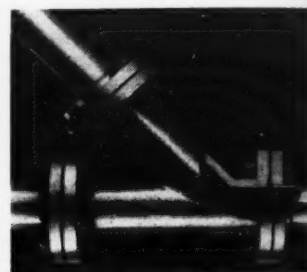
Reading, Pa., Atlanta, Boston, Chicago, Denver, Detroit, Houston, New York, Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn.

SAFETY

Safety factor important in use of saran-lined pipe for sulfuric

Lasts six years at Westvaco with no failure

Problem: Extra heavy steel pipe had a life of less than 18 months in 72% sulfuric acid service at Westvaco Chlor-Alkali Div., Food Machinery & Chemical Corporation, South Charleston, W. Va. This was not only a high maintenance item, but was also a safety hazard since the pipe was located overhead. Pipe made from another metal also lasted only 18 months and had frequent local failures.



Pipe carrying sulfuric is continuously lined with saran

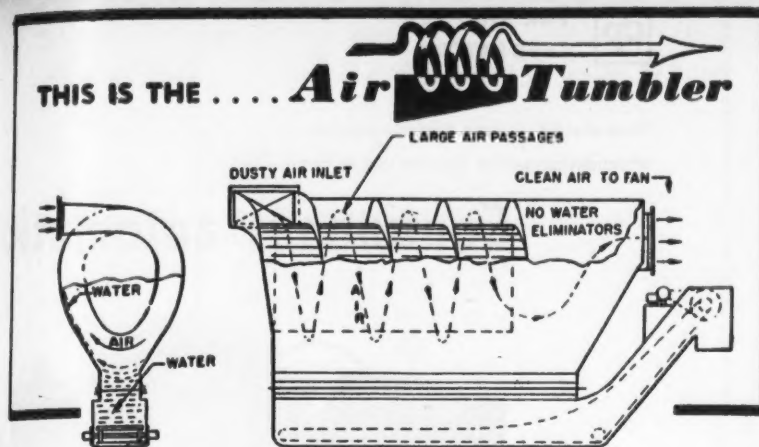
Pipe was used to return spent sulfuric acid to concentrator after it had been used for drying chlorine. Acid in pipe is at atmospheric temperature.

Solution: Saran-lined pipe was installed for handling the 72% sulfuric acid. About 900' of 2½" and 600' of 3" saran-lined pipe was placed in service at a total cost of \$9000 installed. Cost was about three times that of the extra heavy steel pipe.

Results: Saran-lined pipe has been used for six years with no failure. Plant has eliminated the high maintenance costs on the line and has made the chance of an accident from a sulfuric acid leak less likely.

(For more information contact Saran Lined Pipe Co., Dept. CP, 2415 Burdette Ave., Ferndale 20, Mich. Check 5258 opposite last page.)

When inquiring check 5257 opposite last page



the master of Dust in industry ★ ★ ★

**SIMPLE—DEPENDABLE
NO FIRE HAZARD
HIGH EFFICIENCY
CONSTANT CAPACITY
LOW OPERATING COST**

Write for Bulletin No. 551. Address:

DUST SUPPRESSION & ENGINEERING COMPANY

P. O. BOX 67, LAKE ORION, MICHIGAN

Agents in all principal U. S. cities

When inquiring check 5259 opposite last page



thoroughly cleanse chemicals or foreign objects from eyes in precious seconds . . . seconds that may be the difference between permanent injury and good eye-sight! This safety equipment enables workers to self-administer pressure-controlled clear water to afflicted eyes. **HAWS Eye-Wash Fountains** were designed in cooperation with leading Safety Engineers . . . for split-second safety!



HAWS EMERGENCY DRENCH SHOWERS

deliver a sudden torrent of water to dilute and remove injurious acids or caustics from workers' bodies and clothes . . . providing foolproof operation for every emergency. The cost of safety is negligible . . . with HAWS Emergency Facilities! Write today, for full details!

Notes: HAWS also manufactures Drinking Fountains of all types; Electric Water Coolers; and **KRAMER Flush Valves** . . . for any type of plumbing fixture.

HAWS DRINKING FAUCET CO.

1439 FOURTH STREET (Since 1909) BERKELEY 10, CALIFORNIA

When inquiring check 5260 opposite last page

SAFETY

**Portable sump pump
resists corrosion**

Handles flammable, explosive liquids safely

Uses: Unit has wide application in removal of sewage, sludge, chemicals, oil, or clean or dirty water from sumps, wells, excavations, mines, quarries, ditches, trenches, etc.



Sump pump handles flammable and explosive liquids safely

Features: Pump body, impeller, and strainer are made of bronze to resist corrosion and to insure spark-free operation.

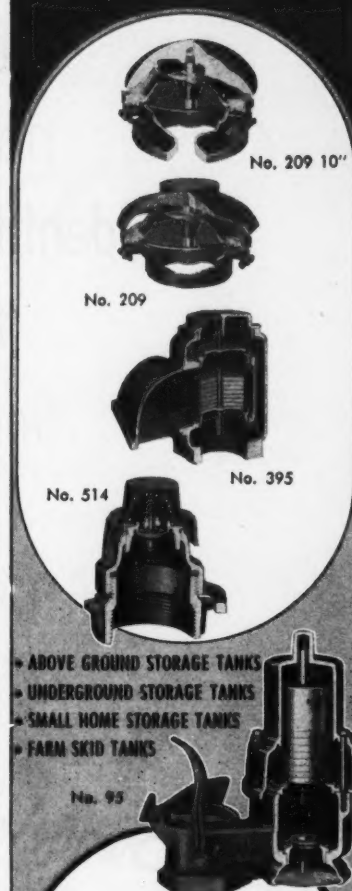
Description: Two-part, non-clogging impeller, mounted on stainless steel shaft, is supported by heavy duty thrust and radial bearings. Double sealing protects bearings and air motor from contamination or damage by dirt or corrosives. Pump needs no priming, is ready for instant use.

(Sump pump is product of Schramm, Inc., Dept. CP, 900 E. Virginia Ave., West Chester, Pa. Check 5261 on form opposite last page.)

Safety loading platforms for tank cars

Bulletin of 16 pages describes and illustrates safety platforms for loading and unloading of tank cars and tank trucks. Safety platform bul — The Nichols Engineering Co., Dept. CP, 3816 Grand Ave., Chicago 51, Ill. Check 5262.

Prevent costly vapor loss with pressurized **OPW TANK VENTS**



There's a vapor saving OPW Tank Vent for every purpose. Precision machined, product engineered for lifetime use, they are your INVESTMENT against vapor loss due to product expansion and temperature variation. Weighted to specifications, OPW Tank Vents trap and hold vapors and release only at set pressures, insuring maximum protection and dollar dividends. Double mesh screen readily accessible for inspection maintains bulk storage safety.

Send for OPW Tank Venting and Emergency Relief Recommendation Chart!

JORDAN CORPORATION

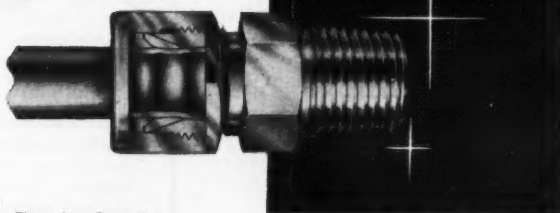
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Cincinnati 13, Ohio
ELmhurst 1-1332



When inquiring check 5263 opposite last page

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one
name
identifies
the
finest
in
fittings

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There is a Swagelok
Specialist in your area.
For catalog, write Dept. C6

**TUBE
FITTINGS**

CRAWFORD FITTING COMPANY

884 East 140th Street
Cleveland 10, Ohio

When inquiring check 5264 opposite last page

cp FOR THE
LABORATORY

Theoretically . . . any analysis capable
of producing a color reaction can be run

Continuous automatic analy



Automatic analyzer. Rotating sample plate is upper right. Reaction solutions are being drawn by pump from bottles. Coils on dialysis unit mix solutions and sample. After warming to temperature in bath, colorimeter (lower left) takes reading

Uses: Developed for monitoring continuous, uninterrupted physiological reaction of a pharmaceutical, automatic colorimetric analyzer can . . . theoretically . . . be used for any test capable of producing a color reaction.

Instrument has already been used for such diverse problems as measuring invert sugar and sucrose levels of streptomycin and penicillin, copper and iron in whiskey. Other possibilities include analyses for metals in ppm range, even running different analyses alternately, as in monitoring boiler water.

Features: Continuous automatic colorimetric analyzer samples, analyzes, and records up to 40 determinations an hour, one every 1½ minutes. Present developmental work on instrument indicates rate of 60 determinations per hour will be practical.

By substituting other measuring and test equipment for the color sensing unit, instru-

ment can be adapted to many routine manual analyses.

Description: So sensitive that the instrument has already been used to monitor continuously for presence of as little as 50 units of an antibiotic in a processing vat, instrument spells out results of analyses on a recorder. Samples are introduced into analyzer in succession, pumped along and mixed with a flowing stream of diluent or test solution. After passing through dialyzer for continuous purification, sample finishes test reaction in heating bath. Sample stream is finally passed through a flow-cuvette colorimeter. Output is indicated on recorder.

As developed for clinical analyses, instrument consists of six components. These are sample plate, proportioning pump, dialyzer, heating bath, colorimeter, and recorder. All of these may not be necessary for industrial laboratory work. Sampling plate may be omit-

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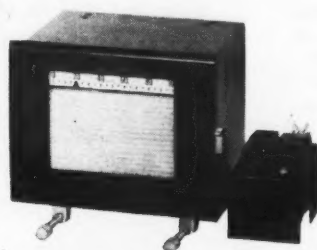
Typic

atic analyzer

SAMPLES ANALYZES MONITORS

ted for continuous sampling of process stream, or sample-producing source as continuous-flow electrophoresis unit. Dialyzer may not be necessary for continuous removal or concentration of solution components.

Sample plate is of acrylic plastic with peripheral depressions. Unknowns are placed in these. Plate rotates at about one revolution an hour. As plate slowly turns, vertically hinged pick-up tube falls by gravity into each depression. After drawing off a sample by suction for a timed period, pick-up tube then rides over space between cups. Air, or other gases, can be drawn in during interval between cups to separate stream of samples. Pick-up tube then

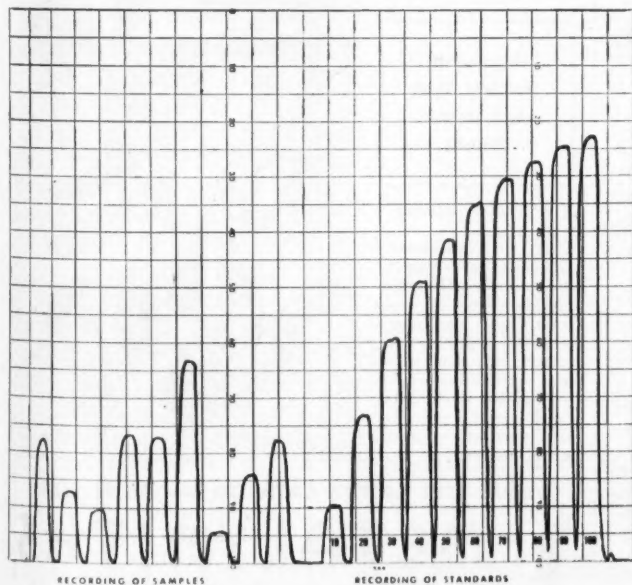


Colorimeter and ratio-recording potentiometer of automatic analyzer. Comparison of unknown against standard indicates analysis result

dips into next sample.

Proportioning pump functions by means of five parallel rollers. These continuously roll over and depress fluid-carrying plastic (PVC) tubes on a spring-loaded bed. Roll-

Turn to next page



Typical recording made by unknown sample against standard. Comparison of the two is made to determine results

Greatest Improvement in Fume Hood Air Flow Control in 20 Years!

MINEOLA, N. Y. — Laboratory Furniture Co., Inc., Mineola, L.I., N.Y., announces its revolutionary new Remote Control for Fume Hoods by which air flow for fume exhaust can now be changed during the operation of the fume hood, and with the safety sash open or closed. Described as the "SAFE 'n EASY" Remote Control, this new exclusive device is operated by a handle, located on the outside control panel, which the chemist turns, right or left, to

apparatus, crawl inside the hood, reach into the rear to adjust baffles manually, and then replace the apparatus. This procedure can often take as much as an hour, plus the hazards of broken instruments and toxic fumes. Laboratory Furniture's "SAFE 'n EASY" way regulates the air flow with one simple motion outside the fume hood, saving valuable experiment time and

* Patent No. 2779265
January 29, 1957

Famous for many firsts in the industry, Laboratory Furniture's newest improvement for fume hoods, the SAFE 'n EASY way, provides the perfect answer to an old problem. Now, with one simple motion, you can move the baffle by remote control and change the Air Flow inside the operating fume hood... without removing the apparatus, and with the sash open or closed. An exclusive STEELAB and WOODLAB feature!



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THESE VALUABLE PLANNING AIDS
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Hundreds of ideas for
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prospectus in the industry.

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When inquiring check 5265 opposite last page



The Roots pump... produces vacuum high and dry—fast

Probably the world's fastest mechanical vacuum pumps in the 10^{-1} to 10^{-5} mm Hg range, the new Roots Pumps eliminate oil vapors from your vacuum system.

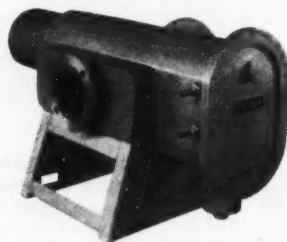
Their finely machined rotary pistons (see diagram) never touch one another or the pump casing. Result: a pumping action which needs no oil sealing, cannot contaminate a system with backstreaming vapors.

You get all these advantages with a Roots Pump:

1. Extraordinary pumping speed. The 39" x 20" x 22" model shown below has a throughput of 10,400 micron-cu. ft. per minute at 10 microns.
2. Motor operates within the vacuum, eliminating need for shaft seals, source of frequent leaks.
3. Exceptionally quiet, vibration-free operation.
4. Very low power consumption.
5. Roughing done directly through the pump with no by-pass or valving needed.
6. Pump starts automatically at a predetermined forepressure in the 10 to 20 mm Hg range (except on smallest model).

Heraeus of Hanau, Germany, manufactures the Roots Pumps. CEC is the exclusive agent for all seven models in this country.

For data on performance and theory of operation, send for Bulletin P-8-20.



Roots Pump Model VP-R 1600
—one of seven Roots Pumps.

See the Roots Pump at the
Cleveland Metals Show, Booth 1929

Consolidated Electrodynamics
Rochester Division, Rochester 3, N. Y.
formerly Consolidated Vacuum
OFFICES IN PRINCIPAL CITIES THROUGHOUT THE WORLD

When inquiring check 5266 opposite last page

LABORATORY

Analyzer

Starts on page 162

ers are suspended and propelled by two loops of moving roller chains, similar to a "caterpillar" tread.

Dialyzer, ordinarily used to separate protein components from solution, so a test analysis can be achieved, is two plastic plates clamped together in a steel frame. Plates have grooved pathways which are mirror images of each other. When clamped together, with sheet of cellophane or other semi-permeable membrane material, two tube-like passages are formed, separated only by membrane.

Heating bath is insulated and thermostatically controlled to very close limits. Actual temperature is selectable over a wide range.

Colorimeter has single tungsten light source, optically divided and collimated to provide two beams. One is used for measuring; the other is for standardization. Relative outputs of two photoelectric cells are automatically balanced by ratio-recording potentiometer.

Graph of reaction results is produced by recorder. Each sample appears as an individual rise. In all tests, standards are run through the system and results are compared to standards.

Only utility requirement is for power, 120v AC. Entire analyzer fits in space of 4 square feet.

(Autoanalyzer is product of Technicon Instruments Corporation, Dept. CP, Chauncey, N.Y. Check 5267 opposite last page.)

Laboratory equipment

Descriptions and prices of pocket pH meters, ovens, analytical and dispensing balances, variety of stirrers, carts, crystal lattice models, and organic molecular models are included in 12-page apparatus review, Lanco Apparatus Review No 7 — Arthur S. LaPine & Company, Dept. CP, 6001 S. Knox Avenue, Chicago 29, Ill. Check 5268.

when production
depends on
performance



...rely on the

Ingersoll-Rand MOTOR PUMP

Ingersoll-Rand pumps are designed and built for maximum performance, efficiency and trouble-free operation. The I-R line is complete—available in many styles and sizes for any type of installation.

- COMPACT DESIGN—saves space
- OPERATES IN ANY POSITION—no special baseplate
- NO ALIGNMENT PROBLEM—motor is directly connected to pumping unit
- MODERN I-R FEATURES—maximum efficiency, low maintenance
- WIDE RANGE OF SIZES— $\frac{1}{4}$ to 75 hp; 5 to 2800 gpm capacity

Get full details on these modern centrifugal pumps.

Ingersoll-Rand

9-489 11 Broadway, New York 4, N. Y.

When inquiring check 5269 opposite last page

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Prompt Shipment
Anywhere

"Metalsmiths"
Stainless Steel
and Monel
Utensils

Get New Catalog.

Order with confidence. Over 30 years' supplying process industries. Highest quality materials and workmanship for durable, corrosion-resistant service. Additional items—beakers, stock pots, batch cans, shovels. Get catalog — Send a trial order.



WRITE FOR LATEST CATALOG — PRICE LIST

METALSMITHS
556 White St., Orange, N. J.
Specialists in Corrosion-Resisting Equipment

When inquiring check 5270 opposite last page

CHEMICAL PROCESSING

LABORATORY

**Reads like tire gage —
pocket gage measures
rubber hardness**

Indicates Durometer units

Uses: Vest-pocket hardness gage is designed for testing rubber and plastics according to ASTM specifications.

Features: Instrument gives readings in manner similar to tire gage.

Description: Unit has hardened steel indenter which comes into contact with material being tested. Runner of vernier is pushed up by indenter and held up by friction, enabling instrument to be removed and read elsewhere. Runner is pushed down for new readings.

Vernier indicates hardness in Durometer units that comply with ASTM specifications for rubber hardness. Total range is 0.100". Divisions permit readings to 0.001" or one Durometer point. Scale reads directly to five points with interpolation to two points by average vision. With a magnifier, closer readings can be made.

Leather-cased instrument weighs just 1½ oz.

(Rex Model A hardness gage is product of W. F. Orth, Dept. CP, 802 S. Ada St., Chicago 7, Ill. . . or for more information check 5271 on form opposite last page.)

QUESTIONS AND ANSWERS ON THE AUTOMATED PLANT

What does the automated plant mean to the processing industries? More than twenty of the nation's top men in the instrumentation and data reduction fields met for a spontaneous discussion covering nearly every possible question . . . of both management and operations. Be sure to read the exclusive report in September's instrumentation feature.



Before and after pictures show various elements (all of unusual shape) for use in a pilot plant . . . without and with specially tailored heating mantles.

GLAS-COL MAKES HEATING MANTLES FOR DIFFICULT, COMPLICATED SHAPES

If you have a complicated heating problem . . . an application that calls for a heating mantle of unusual and difficult shape, it will pay you to get in touch with Glas-Col.

Glas-Col has tailored thousands of electric heating mantles for special applications . . . many of them even more complicated than those shown above. Glas-Col mantles are built in three different types

of fabrics . . . glass-fabric for applications to 450°F . . . quartz-fabric for applications to 1200°F . . . and "R" fabric for applications to 1200°F which will be subjected to heavy, punishing usage.

For additional information relating to special or standard heating mantles, contact Glas-Col Apparatus Company, Dept. CP, 711 Hulman Street, Terre Haute, Indiana.

*specialists
in production,
pilot plant,
and laboratory
heating problems*

GLAS-COL — the world's largest manufacturer of heating mantles
ELECTRIC HEATING MANTLES

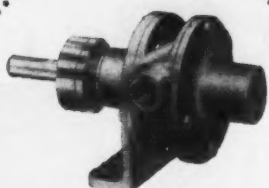


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U. S. Patents—
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2,231,504
2,739,221

When inquiring check 5272 opposite last page

cut pumping costs with

JABSCO INDUSTRIAL PUMPS



Model 2870
816 S.S. Construction—
1 1/4" Port Size—Stuffing
Box Seal—Carbon
Bearings

- ▶ INSTANTLY SELF-PRIMING
- ▶ SIMPLE, COMPACT, ONLY ONE MOVING PART
- ▶ DURABLE NEOPRENE IMPELLER
- ▶ SELF-LUBRICATED
- ▶ TROUBLE-FREE OPERATION



HERE'S another Jabsco industrial pump—designed and built for chemical, pharmaceutical and other industrial applications. Ideal for transfer of various liquids and acids—sump drainage, coolant pumping, general transfer, pulp in solution, filtering, brines, plating solutions—even fluids containing foreign matter or particles, silt, crystals, and other gritty materials. Bronze, stainless steel or plastic construction is available to solve your specific pumping problems. Pumps either light or heavy viscous liquids. Temperature ranges from 35° to 180° F. Write for a Jabsco factory recommendation for your own needs. Specify application, fluid pumped, temperature, pressure, etc.

FREE—send for catalog sheets, detailed information... no obligation, of course!

PATENTED AND PATENTS PENDING

JABSCO PUMP COMPANY

2031 Lincoln Street, Burbank, California

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FULL CONE—HOLLOW CONE—FLAT SPRAY

Spraco has the most complete line of nozzles available anywhere—**IN STOCK**. Capacities range from 1/8 pint/min. to 4000 gal./min. Bronze, cast iron, and stainless steel. Write for our nozzle catalog.

SPRAY ENGINEERING CO., 125 Central St., Somerville 45, Mass.



When inquiring check 5274 opposite last page

LABORATORY



Eliminating seizure

... of jointed glassware, sleeve made of polytetrafluorethylene also stops contamination by stop-cock lubricants and "leaking" ground joints. Sleeves are tapered to fit ground glass cones. They are inert chemically except in presence of metallic sodium.

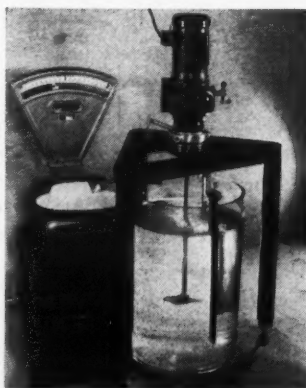
("Quorn" taper sleeves are product of Arthur F. Smith Company, Dept. CP, 311 Alexander St., Rochester 4, N. Y. Check 5275.)

Directly determines hp required for mixing

Designed for non-Newtonian fluids and gas-liquids

Uses: Direct determination of required horsepower to mix non-Newtonian fluids and gas-liquids in a test setup.

Features: Dynamometer accessory for experimental agitator displays force required on laboratory scale. Scale reading calculated against

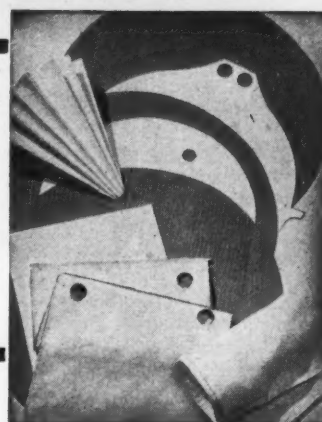


Horsepower required for mixing non-Newtonian fluids is read directly on scale

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FILTER MATERIALS

Will help YOU with your particular filter requirements



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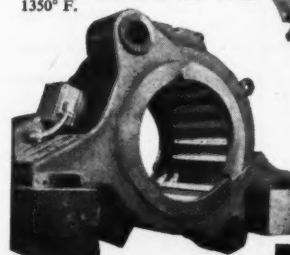
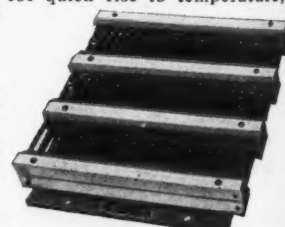
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"FOLDED-and-FORMED" Heating Elements

are quickly, easily installed in furnaces, ovens, kettles, etc., to assure a heat source unequalled for quick rise to temperature; long-life efficiency; low-cost maintenance and repairs.

STANDARD RACKS

Temperatures from 750° to 1700° F. Sizes 12" x 12". Installed vertically or horizontally, side-by-side, end-to-end, or in banks, to meet K. W. requirements. Five-year guarantee, at temperatures to 750° F. or 1350° F.



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Available in wide range of sizes and combinations, to fit any flat or curved area, to provide maximum K. W. at temperatures to 1850° F. Hundreds of different applications are demonstrating the outstanding efficiency and economy of "F-and-F" Heating Elements. You, too, can use them profitably!



Electrically Heated Industrial Equipment
242 LEVERINGTON AVE., PHILA. 27, PA.
In Canada: Supreme Power Supplies Limited, Toronto 14

When inquiring check 5277 opposite last page

CHEMICAL PROCESSING

LABORATORY

moment gives horsepower.

Description: Accessory consists of a three-leg stand with adjustable leveling feet, ball thrust-bearing mounting for experimental mixer, and a moment arm assembly pivoting from bracket on one leg of stand.

Motor torque is transmitted through arm to pan of laboratory scale. Amount of force is displayed in pounds. Substitution of values in standard horsepower formula gives answer.

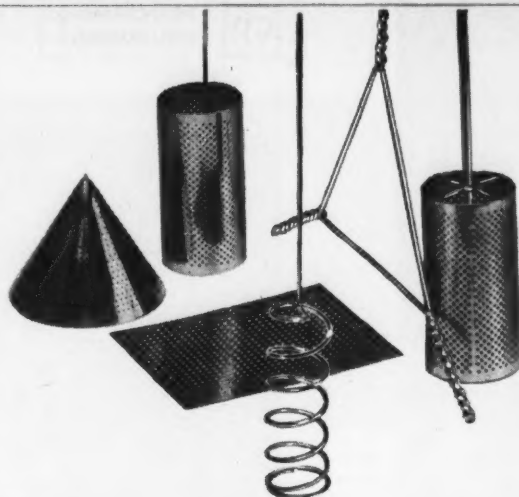
(Dynamometer accessory for experimental mixer is product of Chemineer, Inc., Dept. CP, 1044 E. First St., Dayton, Ohio ... or for more information check 5278 on the convenient Reader Service slip which is located opposite last page.)

Paper chromatography

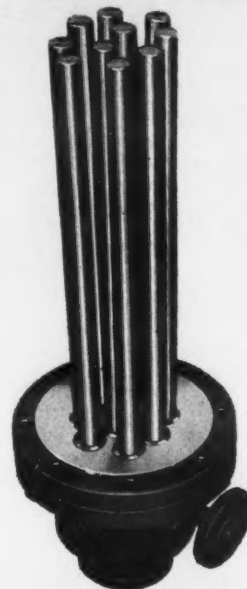
Apparatus necessary for one and two-dimensional paper separations is listed in six-page bulletin that discusses growth of paper chromatography. Instrument of wide DC voltage range for electrophoresis measurements is also described. Bul 80 — Central Scientific Co., Dept. CP, 1700 Irving Park Rd., Chicago 13, Ill. Check 5279.



h2-bough

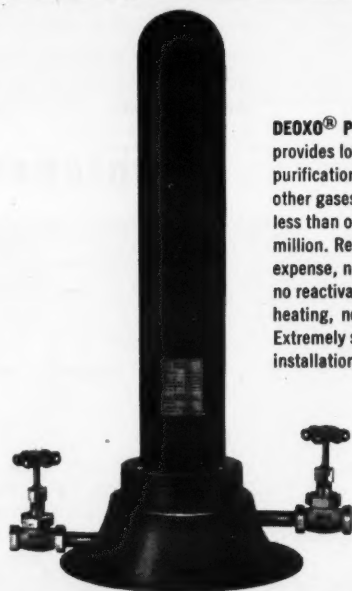


LABORATORY WARE ... a wide variety of forms and sizes for chemical and physical purposes, made of platinum or any desired alloy. Line includes crucibles, reshapers, triangles, dishes, electrodes, anodes and cathodes.



PLATINUM CLAD ... sheet, tubing, wire, etc.—provides all of the desirable qualities of the noble metals with a minimum of capital outlay. BAKER's Platinum Clad process guarantees a continuous pinhole-free corrosion resistant surface, able to withstand high temperatures without oxidation.

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DEOXO® PURIFIER ... provides low-cost catalytic purification of hydrogen and other gases to the extent of less than one part oxygen per million. Requires no operating expense, no maintenance, no reactivation, no auxiliary heating, no water cooler. Extremely simple installation.



SUPER-SENSITIVE DEOXO® INDICATOR ... for measuring oxygen or hydrogen present as impurities in other gases. Accurately indicates from 0.0002% to 0.0200% (2 to 200 parts per million) oxygen, and from 0.0004% to 0.0400% hydrogen. A dual range permits measurement of up to 0.25% oxygen or 0.5% hydrogen.

Write for complete catalog material and details.

BAKER PRECIOUS METALS

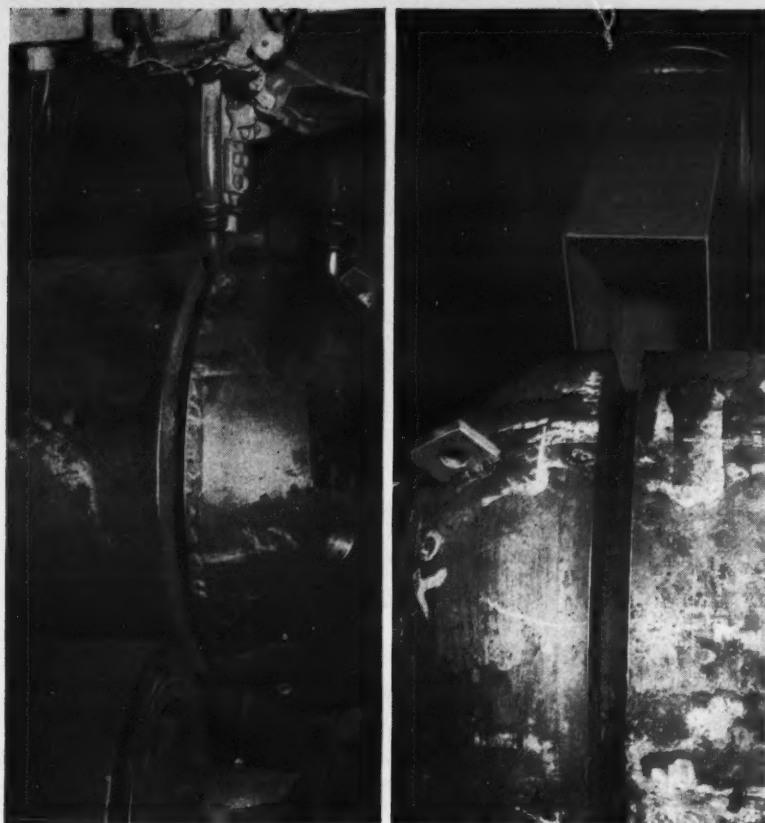
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ENGLAND INDUSTRIAL

RESEARCH MAINTAINS BAKER'S LEADERSHIP IN PRECIOUS METALS

When inquiring check 5280 opposite last page



WELDING...

X-RAYING...

2-inch-thick seam at Downingtown

Item: Air Dryer Cylinder

Material: Carbon Steel

Thickness: Head, 2"—Shell, 2-5/16"

Design Pressure: 3200 psi

Hydrostatic Test Pressure: 5400 psi

Design Temperature: 450° F.

Stamping: National Board and ASME

X-rayed and stress relieved. Inspection by purchaser and Hartford. One of 8 identical units. The rest of our plant equipment is geared to our capacity for welding 2-inch-thick material and lifting 80 tons. Write for bulletins; illustrating Downingtown equipment and experience.

Downingtown Iron Works, Inc.

144 Wallace Ave., Downingtown, Pennsylvania

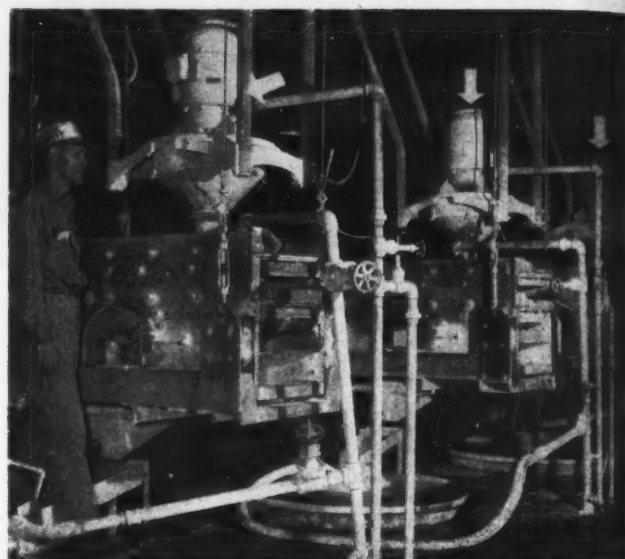
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Branch offices in principal cities

HEAT EXCHANGERS—STEEL AND ALLOY PLATE FABRICATION
CONTAINERS AND PRESSURE VESSELS FOR GASES, LIQUIDS AND SOLIDS



When inquiring check 5281 opposite last page

cp PROCESSING
EQUIPMENT



CP Staff Photo

Centrifugal mixers (arrows) are suspended from ceiling, freeing floor space. In next step mixture passes through screens (below mixers).

While bearings of former units used for handling difficult-to-disperse coating system had to be replaced every three months and a major overhaul of each unit was necessary every six months, present centrifugal mixers provide —

maintenance-free mixing

Compact, easy-to-clean units operate at double the previous production rate, cost half as much as former mixers

GORDON WEYERMULLER, Associate Editor

Problem: A terrific amount of maintenance was required on former dispersers used for mixing a coating system at the Luke, Md., plant of West Virginia Pulp and Paper Company. Bearings had to be replaced every three months and a major overhaul of each unit was necessary every six months.

Mixers were used for dispersing an adhesive (starch or casein) in a suspension of clay in water. Mixture is difficult to disperse since it is thixotropic and viscous. It nor-

mally has a viscosity of 4000 to 8000 cps and a density of 12.5 lb/gal. Coating is used in the production of high quality enameled magazine paper and cover stock.

Previous dispersers used a small mixing chamber with a rotor which furnished shear-acting action through close clearances. Tolerances were so close that excessive wear occurred, making repair costs extremely high. Maintenance interfered with process, causing a production bottleneck, slowing down the next step,

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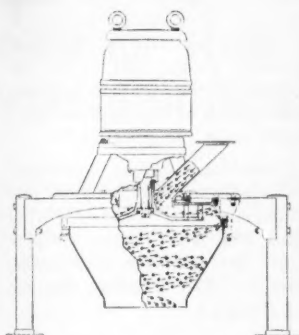
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which consists of screening to remove impurities such as sand and lumps.

Plant also had trouble with leakage from former units. This resulted in the loss of a considerable amount of coating and caused poor house-keeping. In efforts to improve the operation, another type of mixer was tried but it did not prove to be satisfactory.

Solution: In August 1954 a high-speed, continuous centrifugal mixer, known as "Entoletter" mixer, was placed in service. Some experimental work was done to standardize the unit to this type of operation since it had been used principally on dry material in previous applications. A second and third centrifugal mix-



er were installed later and plans have been made to place a fourth unit in service.

Mixer has a 7½-hp enclosed motor connected directly to 12" mixing rotor, which operates at 3500 rpm.

Standard rotor consists of two steel discs spaced about one inch apart by impactors. Units in use at the Luke, Md., plant have stainless steel rotor and shaft. Material enters mixer at side and is directed by distributor to rotor center, where it is spun out by centrifugal force into thinning film as it approaches rotor perimeter. Material discharges uniformly through hopper to outlet.

Results: Centrifugal mixers have operated largely main-

Turn to next page

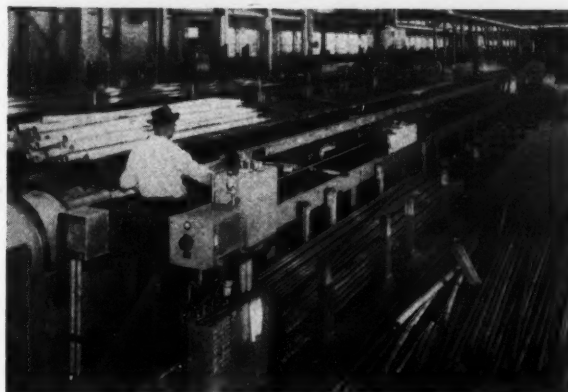
Here's why you get that extra measure of performance from

BRIDGEPORT heat exchanger tubes

From spectograph to shipping, every step of Bridgeport Heat Exchanger Tube manufacture is carefully and closely controlled. Research, experience, skill and attention to your individual needs are integral qualities of every Bridgeport Heat Exchanger Tube that pay off in performance. Put them to work for you by calling your local Bridgeport Sales Office.



1 ELECTRONIC SPECTROGRAPH analyzes the composition of alloys from which condenser and heat exchanger tubes are made. From the very beginning, product performance and customer satisfaction are essential. Maintaining high metallurgical standards means high tube quality—it starts here.



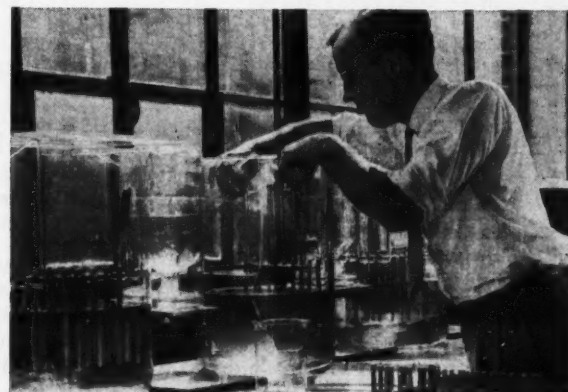
2 MODERN DRAW BENCH (its size speaks for itself) and others of the same "caliber" bring copper, alloy condenser and heat exchanger tubes down to exact, uniform dimensions.



3 HIGH-TEMPERATURE ANNEALING FURNACES give tubes the proper physical characteristics.



4 CLOSE INSPECTION of diameter, wall thickness and surface finish is made—another step that assures you that your Bridgeport tubes are made to flawless standards.



5 CORROSION RESEARCH is continuous at Bridgeport Corrosion Laboratories. Here the many alloys used under all corrosive conditions are tested; new alloys are developed from the knowledge and experience acquired here and in the field.



BRIDGEPORT CONDENSER & HEAT EXCHANGER TUBES

Bridgeport Brass Company • Bridgeport 2, Conn. • Offices in Principal Cities

In Canada: Noranda Copper and Brass Limited, Montreal

When inquiring check 5282 opposite last page

Where dependability is at a premium...



**FW Vaporizer at
AUTOMATED
Gasoline Plant
gives trouble-free
operation in virtually
unattended service**

At the Ropes Field Plant, operated by Honolulu Oil Corp., slightly less than 2000 MCF of gas per day were available for processing — hence capital expenditure and operating costs for this isolated gasoline plant had to be kept to an absolute minimum. Process heating is provided by a FW vaporizer using Para-Cymene which operates at only 380 F, 8 psig! Designed for maximum automation and a minimum operating force, the Ropes installation has fully lived up to the owners' expectations for dependability and economy of operation.

*high-temperature, low-pressure units
HEAT-ENGINEERED by FW
prevent outages — cut maintenance*

OVER a period of 23 years, Foster Wheeler engineers have recognized that an *entire process system* should be analyzed before recommending the proper high-temperature, low-pressure vaporizer. This application engineering "beyond the vapor outlet" assures a vaporizer that's *right* for the job — perfectly matched to a heating system with the most efficient and dependable piping arrangements, circulation method and thermal design.

Another advantage is that only Foster Wheeler does the *complete job* — designs and builds the vaporizer, installs it in your plant, puts it "on stream", and follows through with checkups and service to assure continued top performance under changing conditions of operation. For further information, send for Bulletin ID-54-5. Foster Wheeler Corporation, 165 Broadway, New York 6, N.Y.

FOSTER WHEELER

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When inquiring check 5283 opposite last page

PROCESSING

Centrifugal Mixer

Starts on page 168

nance-free, principal upkeep being confined to the motor. Since coating mixture is thixotropic, the viscosity decreases as the rate of shear increases. Hence, the centrifugal mixer which does not have close tolerances (in contrast to former unit) gives a better reduction in viscosity while reducing wear on equipment.

Production throughput for each unit has been doubled to 38 gpm, compared to 20 gpm handled by former mixer. Dispersion has been found to be completely satisfactory at the high rate. Initial cost of centrifugal mixer is only about half that of previous unit. Present mixer is compact and can be suspended from ceiling so that floor space is free. It operates so quietly that one cannot easily tell from the sound if the unit is running. Simplicity of construction permits easy cleaning.

(Centrifugal mixer is product of Entoleter Div., Safety Industries, Inc., Dept. CP, PO Box 904, New Haven 4, Conn. . . . or for more information check 5284 located opposite last page.)

Water, waste treatment

Containing cross-references for manufacturer's bulletins devoted to specific equipment for water and waste treatment, company's 32 page catalog serves as handy guide. Bul 80 — Inflico Inc., Dept. CP, Tucson, Ariz. Check 5284A.

Dust collector facts

Construction, specifications, and performance of compact, wet-centrifugal-type dust collector are described in four-page bulletin. Bul J-616 — Joy Mfg. Co., Dept. CP, Henry W. Oliver Bldg., Pittsburgh 22, Pa. Check 5285.

For more information on product at right, specify 5286 . . . see information request blank opposite last page.

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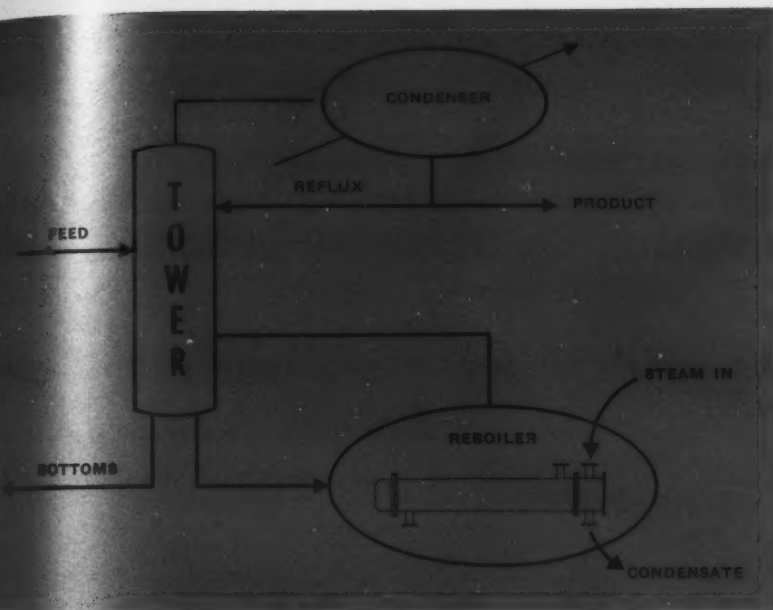
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CESSING



WOLVERINE TRUFIN® DOES IT AGAIN

REDUCED TUBE CLEANING FREQUENCY BOOSTS BUTANE REBOILER EFFICIENCY

BY ERNEST DODD

Because of their enthusiasm, Texans undergo a great deal of teasing. But there's one thing that's sure. Show a Texan a product that can help him do a better job and he'll put it to work—but fast.

Such a product is Wolverine Trufin Type S/T—the integrally finned condenser tube. Here is the story of how process engineers in a certain Texas refinery are using this extended surface tubing to increase butane reboiler efficiency.

Slightly more than a year ago, these engineers placed on stream, a reboiler with steam on the tube side and butane, containing a fairly large amount of pentanes, on the shell side. The unit was tubed with 384 pieces of Trufin Type S/T condenser tube which, because of its increased surface, enabled the refinery to handle the reboiling of this mixture by using steam at atmospheric pressure.

During the first month of operation, overall heat transfer coefficients were taken. However, these coefficients appeared so high for the mixture involved, that the engineers stopped taking data and decided to see what the overall operation would be over a longer period of time.

From previous experience, the engineers knew that when the unit was tubed with plain tube it was necessary,

after approximately a year, to increase steam pressure by 75 or 80 pounds to accommodate the heat load. However, as the months rolled by, the reboiler continued to operate at atmospheric pressure. Furthermore, it had always been necessary, after a year of operation, to pull the plain tube bundle for cleaning.

The Trufin-tubed unit showed no indication of requiring cleaning. Indeed quite the contrary is true, the interpretation of their own data has convinced the engineers that it will not be necessary to clean the shell side of this unit for an indefinite period.

Since the object of retubing with integrally finned tubing was to increase on stream time, the conclusion of these processing engineers is that Wolverine Trufin Type S/T has amply proved its ability to withstand fouling in this type of operation for longer periods than does prime surface tubing.

CALUMET & HECLA, INC.

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Division of Calumet & Hecla, Inc.
1469 CENTRAL AVE., DETROIT 9, MICH.

Manufacturers of Quality Controlled Tubing and Extruded Aluminum Shapes

PLANTS IN DETROIT, MICHIGAN, AND DECATUR, ALABAMA.
SALES OFFICES IN PRINCIPAL CITIES.

EXPORT DEPARTMENT, 13 EAST 40TH STREET, NEW YORK 16, NEW YORK

TYPE S/T AT HOME IN OLD OR NEW UNITS

Wolverine Trufin Type S/T is a completely versatile condenser tube—equally at home, in new units or old. When new heat exchangers and condensers are designed around Wolverine Trufin Type S/T, they are smaller and more compact because Trufin's integral fins increase heat transfer surface—extract more BTU's per foot of tube. The result is a substantial saving in direct tube costs as well as in labor and the materials that go into headers, baffles and shells.

When used for retubing purposes, Type S/T steps up the capacity of existing equipment because its greater surface area packs more heat transfer surface into the same size shell.

Also of major importance when retubing, is the fact that Trufin Type S/T is completely interchangeable with the plain tube it is designed to replace. During the finning process the ends of the tube are left without fins and the tube is designed so that the O. D. of the plain end is slightly larger than the O. D. over the fins.

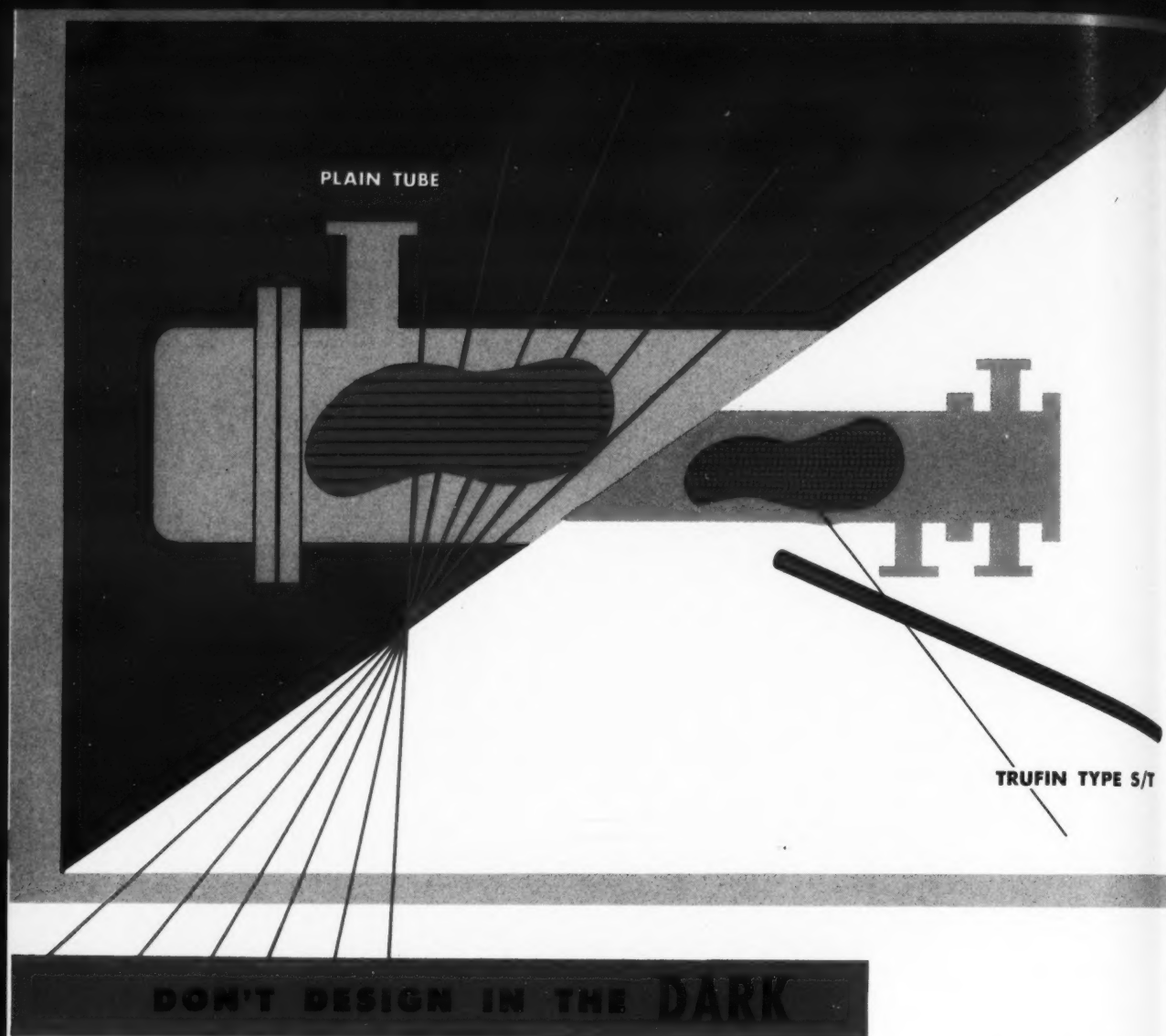
Because of this, Trufin can thus be inserted into the bundle and rolled directly into the tube sheet in the regular manner using standard retubing techniques and tools.

TECHNICAL HELP FROM FIELD ENGINEERING SERVICE

Always available to help customers solve problems in alloy selection, design and corrosion, etc., are the skilled members of Wolverine's Field Engineering Service. Their services are yours without obligation. Call on them next time you need help.

SEND FOR THIS FREE BOOK

Wolverine's condenser tube catalog is a ready source of information for those engaged in the field of heat transfer. In addition to descriptions of Wolverine's complete condenser tube lineup this valuable book also has sections on alloys, specific tubing applications, the effects of corrosion on various metals, etc. This handy reference book is yours absolutely free. Write for your copy



With the development of Wolverine Trufin Type S/T—the integrally finned condenser tube—a new day has dawned for designers and fabricators of heat transfer equipment.

Now it is possible for engineers to design lower cost heat exchangers. All that is necessary is to design around integrally finned Trufin Type S/T—rather than around plain tube. Trufin, you see, has integral fins which are actually squeezed from the tube wall. The result is more heat transfer surface per foot of

tube which, of course, means greater BTU extraction.

Because of its integral fins Trufin Type S/T, for example, actually has more than $2\frac{1}{2}$ times as much surface area as a piece of prime surface tube of comparable diameter and length. *This is equivalent to an overall increase in surface area of 150%.*

If you are designing new equipment—or retubing old—why not let Wolverine Trufin Type S/T help you shed new light on your problems. For more detailed information write for your copy of the Trufin Catalog.

Wolverine Trufin is available
in Canada through the Unifin
Tube Co., London, Ontario.

CALUMET & HECLA, INC.
CALUMET DIVISION
WOLVERINE TUBE DIVISION
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ALL IN ONE MIXER:

3 way action for better and faster blending



It takes more

... than a simple stirring, tumbling or agitator action to turn out a smooth, uniform blend of wetted, semi-plastic or plastic materials.

And it's more true today than ever before. You're getting better, more uniform raw materials—you're paying more for them and expecting more out of them when it comes to quality control. That's why it will pay you to take a careful look at the equipment you're using to mix these materials.

In the *Simpson Mix-Muller* you get a unique three-way kneading, smearing, spatulate action. Materials are not merely stirred or tumbled together. It's an intensive controlled *mulling*

action that eliminates balling, breaks up agglomerates and actually *coats* one material with the other. Dispersion of moisture, binders or carriers is thorough, uniform and quickly accomplished. You get a mix that *stays* mixed, one that is unaffected in either storage or transit.

A trial will tell the story of how mulling can help you make the most of modern materials and methods. A *mulling test* on your own materials, conducted to your own standards under your supervision, if you prefer, can be arranged. Write for details and remember . . .

MIXING IS OUR BUSINESS

For more information on product at right, specify 5287 see information request blank opposite last page.



SIMPSON MIX-MULLER® DIVISION

NATIONAL ENGINEERING COMPANY

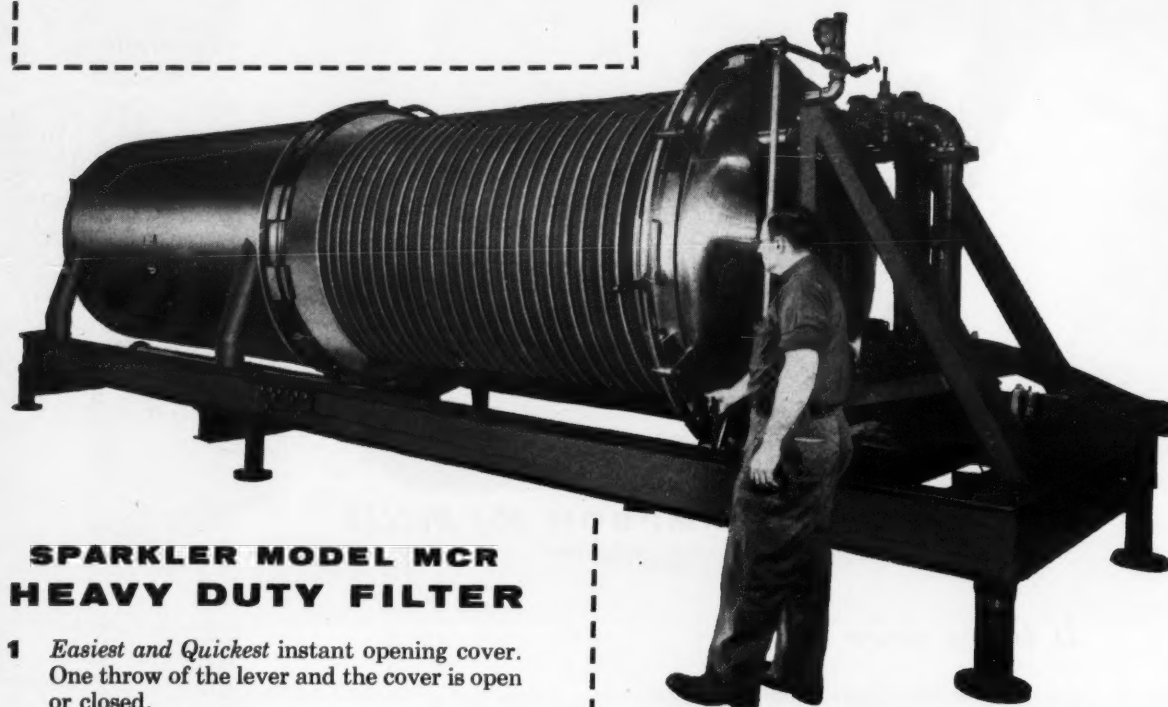
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BUILD A FILTER
THIS GOOD
FOR LESS MONEY**

Built to handle products with a high percentage of solids, with long operating cycles.

Engineered to lower filtration costs.
Fast cleaning with a minimum of down time.

Anyone interested in reliable uniform quality, highest daily volume production, and economical operation, will not be satisfied with anything less than a Sparkler MCR.



SPARKLER MODEL MCR HEAVY DUTY FILTER

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- 2 Retractable tank, hydraulic power operated with finger tip control.
- 3 No breaking of pipe connections with fixed head. No spillage.
- 4 Plates spread far apart to allow full size cake without clogging. Large top plate outlet and bottom drainage outlet reduces flow resistance.

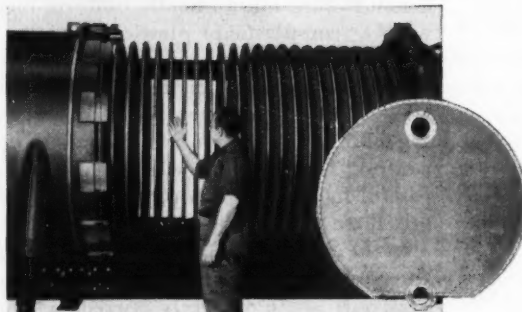
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FILTERS**

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Mundelein, Illinois

Sparkler International Ltd. plants, in Canada, Holland, Italy and Australia

Exclusive filtration engineers for over 30 years



PROCESSING

Fast blending accomplished with ribbon-type mixer

Unit has two sets of helices

Uses: Mixing of dry solids, solids with liquids, liquids, and suspensions.

Features: Efficient design results in fast, thorough blending using only minimum power. Units can be supplied with removable heating jackets, capable of withstanding 70 psi steam.

Description: Blenders are available in 18 different sizes, ranging in working capacity from six to 200 cu ft. Blending is accomplished by a total of six ribbon helices, arranged in two sets (three ribbons in each), with one set located on each side of product outlet. Outlet is in the middle on the bottom side of the unit.

Combination of forces produced by rotating helices pushes portions of the materials in opposite direction, while other portions are simultaneously displaced outward by centrifugal force. Ribbons are designed so that movement of finished product is toward the outlet.

All parts in contact with



Two sets of helices provide fast, efficient blending. One set is located on each side of outlet (in center, bottom of unit)

product can be supplied in 304 stainless steel or carbon steel. Blenders have rounded internal corners and smooth internal finish. Agitator and shaft are easily removed without disturbing bearings in drive. Shaft seals are external and designed so they may be

connected to vent containing from packing est blender in diam, equipped w

(Tri-Rib bl of Bridges est blender pany, Dept. Morristown more inform on form op

Teflon filter can be used -100 to

Porous f sists acic

Uses: A various fil

Features: ethylene serviceable 400°F. The of acids, b lubricants,

Description: sheet is m fluoroethy matter of can withst at 550°F. has been mersion i furic, hydro acids.

Laborat that shee removing from liqu severe c not adhe known m extremely friction.

In add filtration uses ma suspens corrosive vent sea passage leakage separat solvents wetted l

(Additio Armalon obtained de Ner Room 70 mington by check posite l

When inquiring check 5288 opposite last page

PROCESSING

connected to air or gas to prevent contamination of product from packing material. Largest blender (200 cu ft) is 54" in diam, 12' long, and is equipped with 30 hp motor.

(Tri-Rib blenders are product of Bridges Engineering Company, Dept. CP, P.O. Box 233, Morristown, N.J. . . . or for more information check 5289 on form opposite last page.)

Teflon filter sheet can be used from -100 to 400°F

Porous fibrous material resists acids, bases, solvents

Uses: As filter media for various filtration applications.

Features: Teflon tetrafluoroethylene fibrous sheets are serviceable from -100° to 400°F. They withstand attack of acids, bases, fuels, solvents, lubricants, and water.

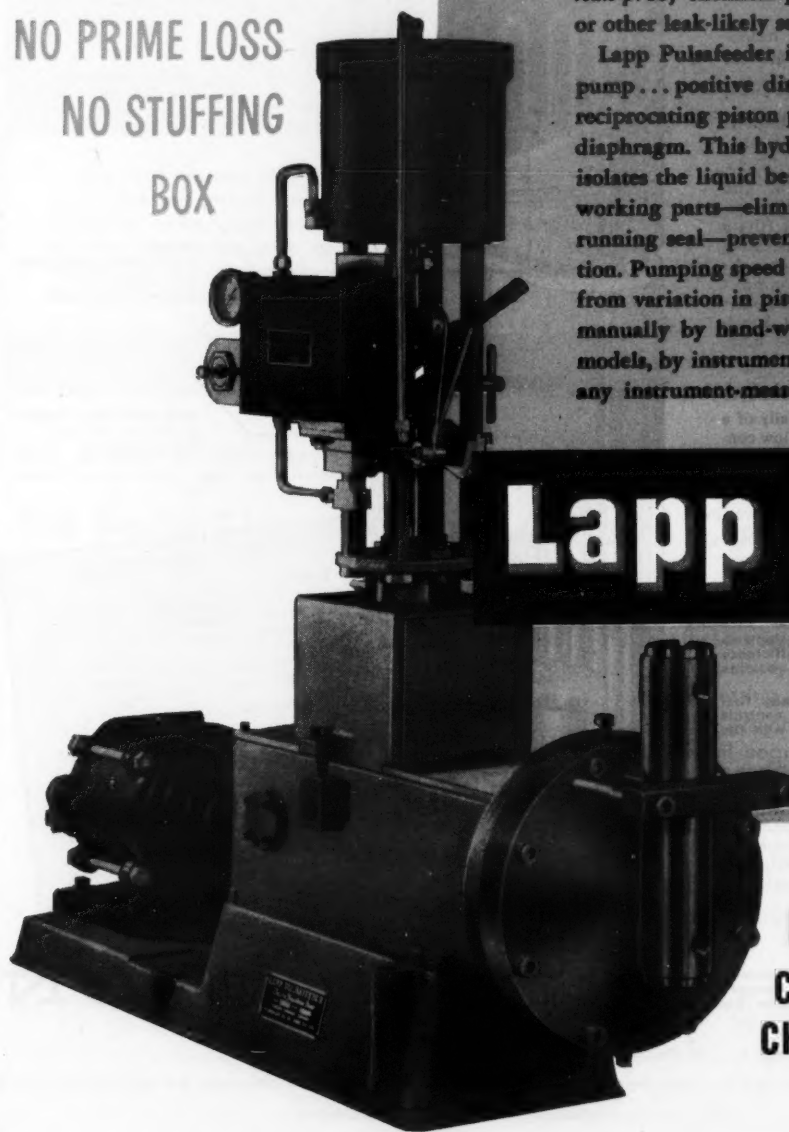
Description: Highly porous sheet is made of Teflon tetrafluoroethylene resin. In the matter of heat resistance, sheet can withstand 7 days exposure at 550°F. Chemical resistance has been tested by 7 days immersion in concentrated sulfuric, hydrochloric, and nitric acids.

Laboratory data indicate that sheets are effective in removing very fine particles from liquid suspensions under severe conditions. They will not adhere firmly to any known materials, and have an extremely low coefficient of friction.

In addition to conventional filtration applications, other uses may be: 1) removing suspended particles from hot, corrosive gases, 2) battery vent seals which will allow passage of gases, yet prevent leakage of electrolyte, and 3) separating water from organic solvents (sheet is not readily wetted by water).

(Additional information on Armalon fibrous sheet may be obtained from E. I. du Pont de Nemours & Company, Room 7017-D, Dept. CP, Wilmington 98, Delaware . . . or by checking 5290 on form opposite last page.)

NO LEAKAGE
NO CONTAMINATION
NO PRIME LOSS
NO STUFFING
BOX



Replace with PULSAFEEDER for Trouble-Free Liquid Metering

When the time comes to replace the chemical pump in your process, replace with a PULSAFEEDER—the leak-proof chemical pump that has no stuffing box or other leak-likely seal.

Lapp Pulsafeeder is a combination piston-diaphragm pump . . . positive displacement is achieved by a reciprocating piston pumping a hydraulic oil against a diaphragm. This hydraulically balanced diaphragm isolates the liquid being pumped from the pump's working parts—eliminates need of stuffing box or running seal—prevents product leakage and contamination. Pumping speed is constant, variable flow results from variation in piston-stroke length . . . controlled manually by hand-wheel, or, in Auto-Pneumatic models, by instrument air pressure responding to any instrument-measurable process variable.

Lapp

WRITE FOR BULLETIN 440 with typical applications, flow charts, description and specification of models of various capacities and constructions. Inquiry Data Sheet included from which we can make specific engineering recommendation for your processing requirement. Write Lapp Insulator Co., Inc., Process Equipment Division, 555 Poplar Street, Le Roy, N. Y.

Lapp PULSAFEEDER CONTROLLED-VOLUME CHEMICAL PUMP

When inquiring check 5291 opposite last page

Announcing to the Process Industries An Entirely New Product by Western Precipitation

...The HI-TURBIANT HEATER!

- A Vertical Direct-Fired Heater For Industrial Heating at Elevated Temperatures!
- Ideal For Handling Heat-Sensitive Fluids!
- Brings New Savings to a Wide Range of Modern Heat-Processing Operations!

Backed by the engineering "know-how" and process-equipment experience of Western Precipitation, the Hi-Turbiant Heater system fills a constantly growing need in modern processing operations—a means of heating such heat-transfer fluids as Dowtherm, Aroclor, hydrocarbon oils and similar heat-sensitive fluids. It is also ideal for other applications—steam superheating, Rich-Oil denuding, asphalt heating and processes where fluids must be heated under close thermal control.

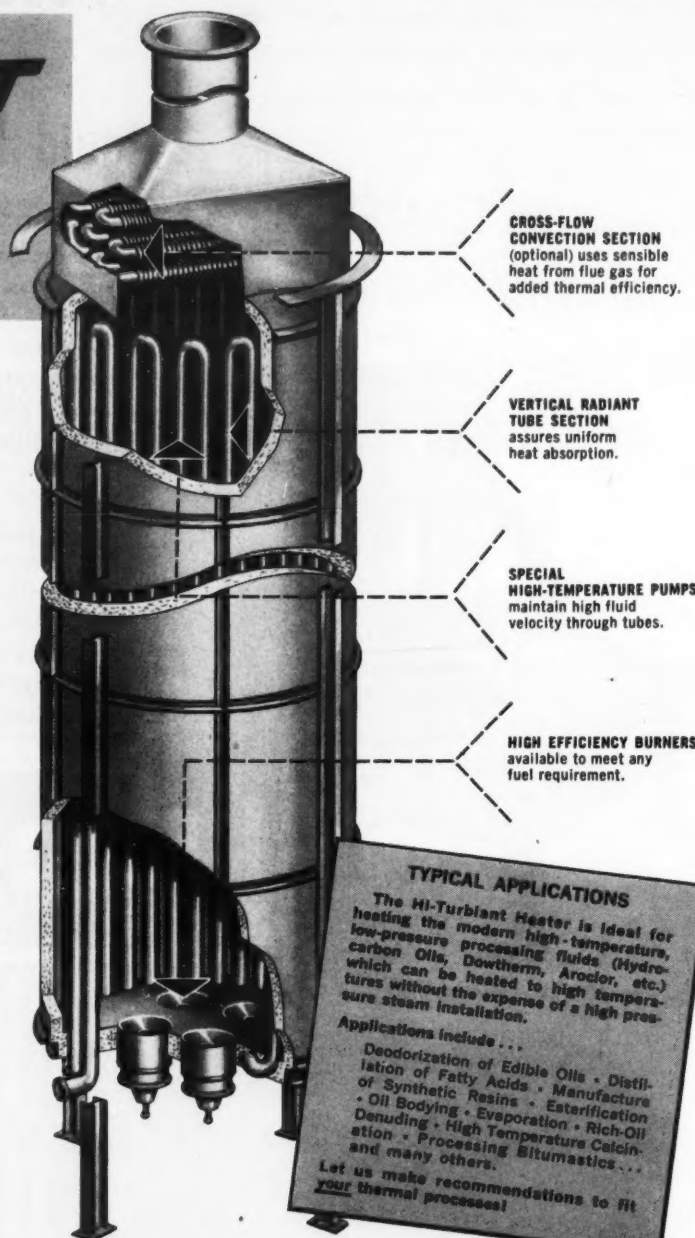
Combines Radiant Heating with High Fluid Turbulence

The Hi-Turbiant Heater consists essentially of a series of "hair-pin" tubes set vertically in a low conductivity refractory setting.

Each radiant tube is exposed to uniform absorption in the cylindrical combustion chamber. A cross-flow integrally mounted finned tube convection section assures high thermal efficiency.

- Forced circulation is provided by specially designed high temperature centrifugal pumps.
- The designed high fluid turbulence permits high fuel efficiencies at maximum operating temperatures for heat-sensitive media.
- Extended surface cross-flow convection section used where maximum thermal efficiency is required, or when a second stream requires moderate heating.
- Burners are available to meet any fuel requirement. Complete combustion controls are provided to integrate the heater with the controlled process.

The Hi-Turbiant Heater system is available in a complete range of sizes from 3 to 40 million BTU/hr—with or without a convection section—to meet a wide variety of applications. If you plan process operations using heat-sensitive fluids, let our engineers explain the many advantages of Hi-Turbiant heating. No obligation, of course!



TYPICAL APPLICATIONS

The Hi-Turbiant Heater is ideal for heating the modern high-temperature, low-pressure processing fluids (Hydrocarbon Oils, Dowtherm, Aroclor, etc.) which can be heated to high temperatures without the expense of a high pressure steam installation.

Applications include...

Deodorization of Edible Oils • Distillation of Fatty Acids • Manufacture of Synthetic Resins • Esterification • Oil Bodying • Evaporation • Rich-Oil Denuding • High Temperature Calcination • Processing Bitumastics... and many others.

Let us make recommendations to fit your thermal processes!

WESTERN PRECIPITATION CORPORATION

Engineers and Constructors of Equipment for Collection of Suspended Material from Gases . . . and Equipment for the Process Industries
LOS ANGELES 54 • NEW YORK 17 • CHICAGO 2 • PITTSBURGH 22 • ATLANTA 5 • SAN FRANCISCO 4

Representatives in all principal cities

Precipitation Company of Canada Ltd., Dominion Square Bldg., Montreal

When inquiring check 5292 opposite last page

PROCESSING

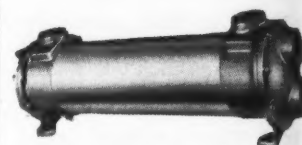
Interchangeable parts permit fast servicing of heat exchangers

Units offer high performance at lower cost

Uses: For heating or cooling various liquids in chemical industry.

Features: All parts of units are standardized to permit fast and easy installation and servicing. Exchangers give high performance at low cost.

Description: Heat exchanger is designed to assure maximum heat transfer with minimum pressure drop. Shell and tubes are designed for working pressures of 75 lb and are



Standardized heat exchanger is mass-produced to keep initial costs low

tested at 115 lb. Bronze bonnets and tube sheets, seamless copper shells, Admiralty tubes, and brass baffles provide good corrosion resistance and long equipment life.

(Hi-Transfer exchangers are product of Whitlock Mfg. Co., Dept. CP, West Hartford, Conn. . . or for more information check 5293 on convenient Reader Service slip located opposite last page.)

Mixing and dispersing done simultaneously in one machine

Uses: Mixing ink, paint, plastics, pharmaceuticals, chemicals.

Features: Mixing and dispersing can be done in single piece of equipment, saving on labor and expense of second machine.

Description: Unit combines mixing advantages of diamond-shaped agitator, rotating, shearing, and impinging action of powerful revolving disperser head. Disperser head, which turns at 3600 rpm,



Duplex disperser and paints further process

forces material zone and rotating can swept into mixing-disperser.

Entire batch glomerates mulling a Dead spot are eliminating intense hypoxed, insuring action, implosion, and According further process.

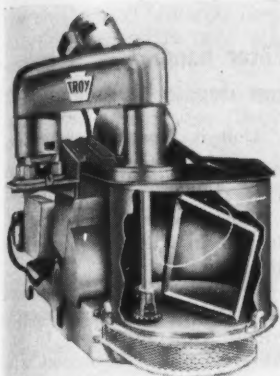
(Duplex I of Troy Co., Dept. Troy, Pa. information opposite 1



"They turn



PROCESSING



Duplex disperser mixes most inks and paints in one operation—further processing unnecessary

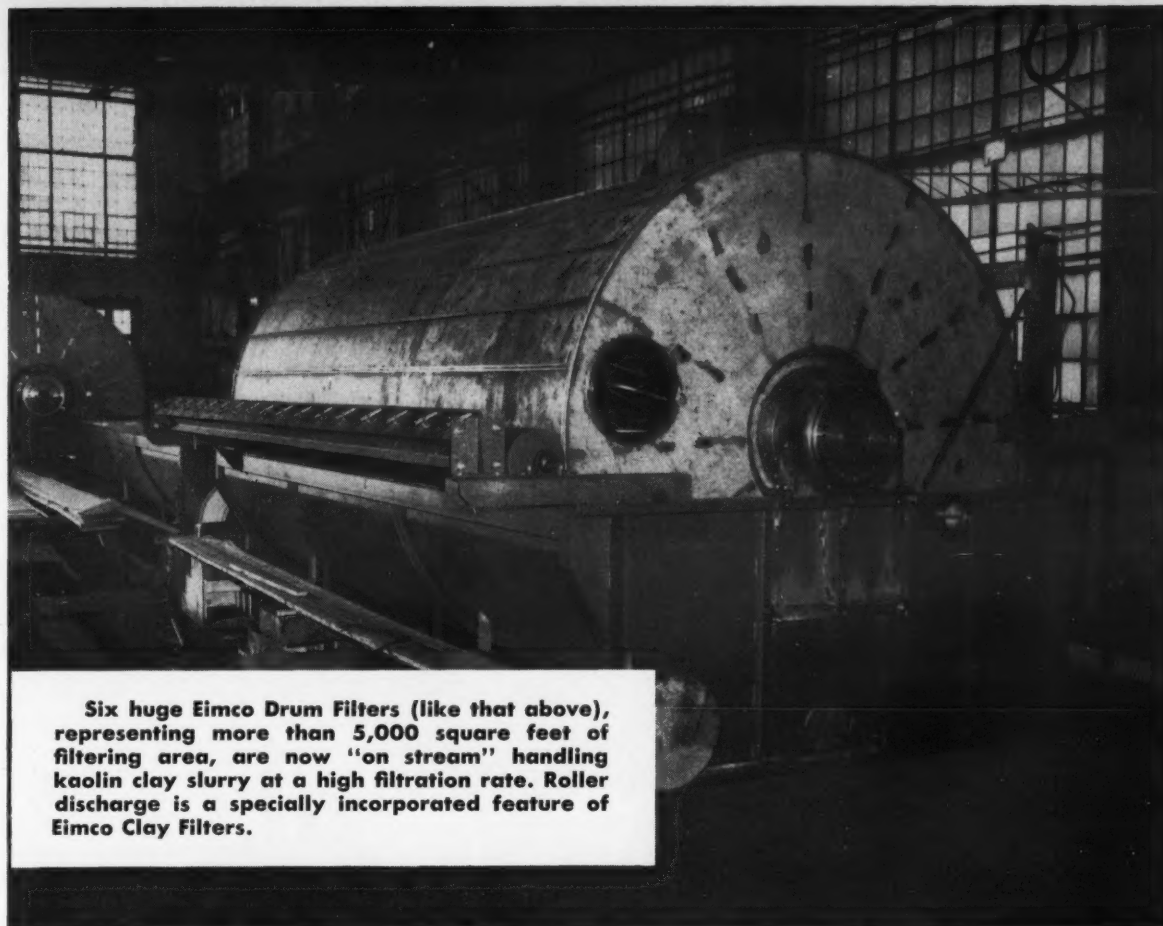
forces material into mulling zone and out toward sides of rotating can. Then it is again swept into agitator blade, and mixing-dispersing cycle is repeated.

Entire batch is agitated, agglomerates are broken, and mulling action is complete. Dead spots and stratification are eliminated. This, plus the intense hydraulic shear developed, insures excellent wetting action, improved color dispersion, and uniform blending. According to manufacturer, no further processing is necessary.

(Duplex Disperser is product of Troy Engine & Machine Co., Dept. CP, 706 Parsons St., Troy, Pa. . . or for more information check 5294 on form opposite last page.)



"They must have the blower turned on 'high' again!"



Six huge Eimco Drum Filters (like that above), representing more than 5,000 square feet of filtering area, are now "on stream" handling kaolin clay slurry at a high filtration rate. Roller discharge is a specially incorporated feature of Eimco Clay Filters.

FOR A KAOLIN CONCENTRATOR

24 Foot Eimco Drum Filters Cut Costs In Half

THE INSTALLATION: Six Eimco 24' x 11' 6" Stainless Clad Vacuum Drum. Filters, largest metal deck drum filters ever shipped assembled. (Over-all dimension 14' wide X 31' long.

THEIR JOB: To materially reduce the costly operation of a plate and frame press station filtering two grades of kaolin coating clay slips.

RESULT: 50% reduction in costs. Based on capital outlay and labor, operating and maintenance expenses . . . this firm is producing a ton of dry clay for half the cost using Eimco Clay Filters.

CUSTOM DESIGN PAYS OFF AGAIN! Like all Eimco Filters, these huge drums were especially designed to process the slurry of a particular industry . . . based on extensive testing and research. Then -- thru accurate conclusions provided by pilot plant tests -- the filters were "detail engineered" to fit the specific needs of this client, and sized to get the most production per manhour of attention.

You, too, can profit from Eimco experience and precision construction. Write for details or talk with an Eimco Sales Engineer!

THE EIMCO CORPORATION
SALT LAKE CITY, UTAH

Research and Development Division, Palatine, Illinois

Process Engineers Inc. Division, San Mateo, California

Export Offices: Eimco Building, 51-52 South Street, New York 5, N. Y.
BRANCHES AND DEALERS IN PRINCIPAL CITIES THROUGHOUT THE WORLD



D-378

When inquiring check 5295 opposite last page



CLEAN

DUSTLESS

RAYMOND MILLS

Low-Cost Producers
of Fine Chemicals

AUTOMATIC

ECONOMICAL

COMPACT

Increase your production efficiency by installing the modern Whizzer-equipped Raymond Roller Mill.

It provides a completely integrated system for pulverizing and classifying a wide variety of chemicals and non-metallic minerals, as well as simultaneously removing surface moisture from many products while being ground.

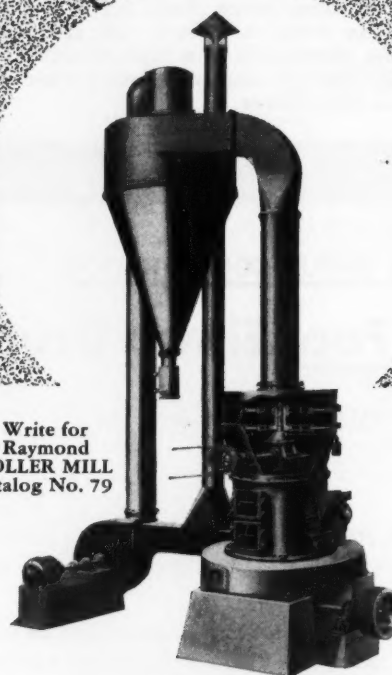
The patented revolving Whizzer maintains consistent uniformity of the product, and gives a full range of fineness control to the lower micron sizes by means of one simple adjustment while the mill is running.

Flash Drying Accessories may be furnished with the mill for handling moisture laden materials, and to insure a fine, dry, free-flowing finished product.

Maximum operating and maintenance economy is a feature of Raymond Roller Mills, due to extra sturdy construction, high grade bearings, and finely engineered design, all fully proved by performance.

Every Raymond Mill is tailored to the particular job it has to do. Tell us your problem, and let Raymond engineers build the equipment that will meet your requirements as to capacity, quality and economy of production.

Write for
Raymond
ROLLER MILL
Catalog No. 79



RAYMOND ROLLER MILL with Double Whizzer Separator for producing fine grade chemicals to the most exacting specifications.

PROCESSING

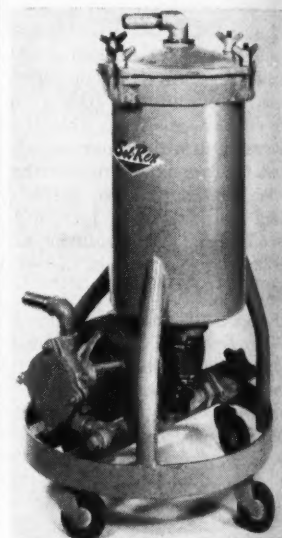
Filter handles 800 gph, can double as pump

Unit is equipped with special by-pass valve

Uses: Filtering various solutions in chemical and allied industries.

Features: Filter is mounted on casters, making it easy to move from one spot to another. Unit is equipped with special by-pass valve which permits pump on filter to be used independently when filter is not in use.

Description: Mobile filter measures 36" high, requires only 1½ sq ft floor space, and has capacity of 800 gph. Unit is equipped with an exclusive



Working parts on filter are easily accessible for servicing

annular stainless steel mesh element which filters through both inner and outer surfaces. Design provides twice the filtering area of conventional elements of comparable size.

Filtering element is attached to tank cover. It can be lifted out easily for cleaning. Standard porous stone membrane media can also be used with unit. Pump and other working parts are suspended beneath filter tank to protect them from dirt or drippings. Units are available in low carbon stainless steel and rub-

ber lined, or construction, de-
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(Model BS-
of Sel-Rex
CP, Nutley,
or for more
5297 on form
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Features:
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paddle tips



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CP, 451 T
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on form

COMBUSTION ENGINEERING, INC.

Raymond Division

1317 North Branch St.
Chicago 22, Illinois

Sales Offices in
Principal Cities

COMBUSTION ENGINEERING-SUPERHEATER LTD., Montreal, Canada

When inquiring check 5296 opposite last page

CHEMICAL PROCESSING

AUGUST

PROCESSING

ber lined, or of all iron construction, depending upon application.

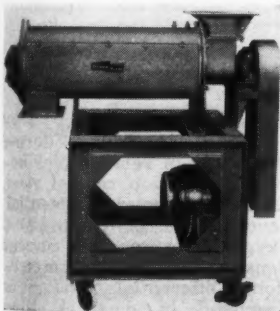
(Model BS-3 filter is product of Sel-Rex Corporation, Dept. CP, Nutley, New Jersey . . . or for more information check 5297 on form which is located opposite last page.)

Adjustable-pitch paddles featured on mixer

Unit is capable of handling up to 10,000 lb/hr

Uses: Disintegrating and dispersing fat pellets and other chemical materials having tendency to ball or agglomerate. Unit may also be used for fluffing powdered products or for adding small percentages of liquids to dry mixes.

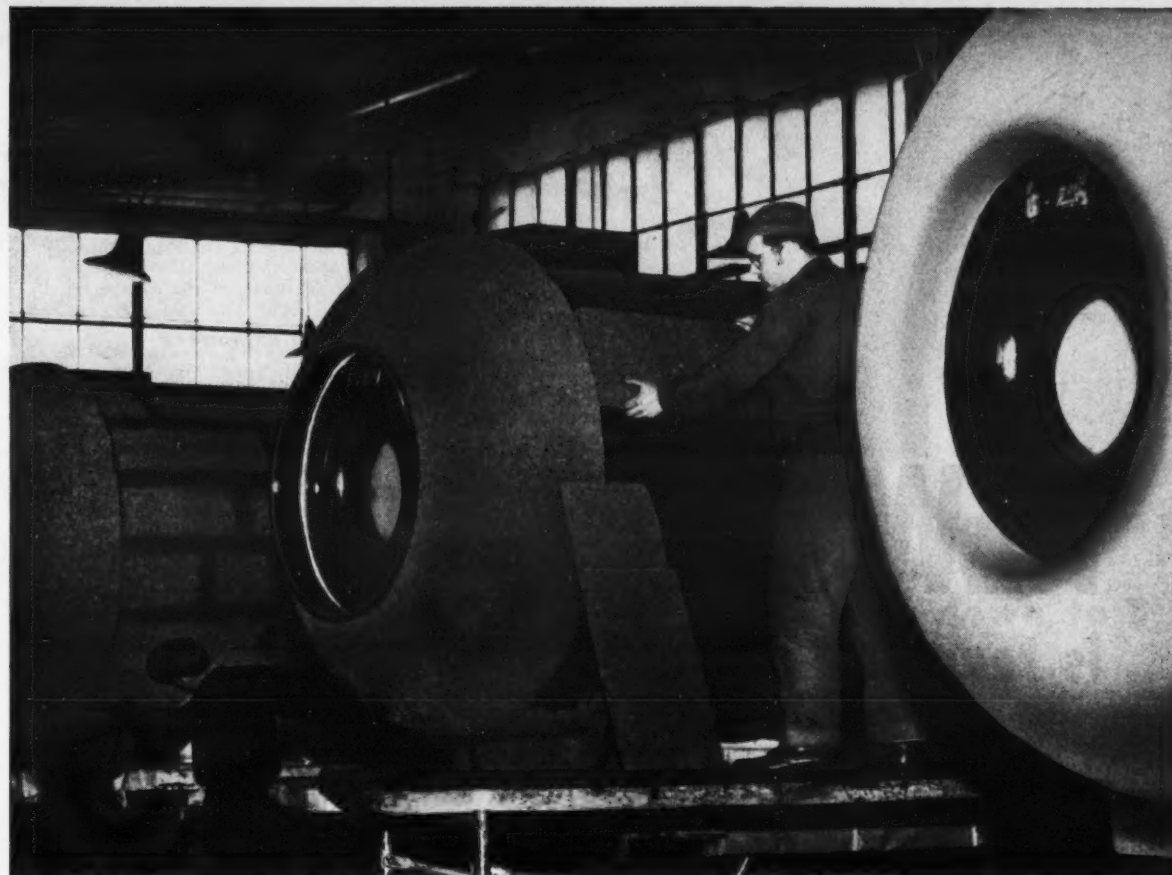
Features: Adjustable-pitch paddles on unit can handle up to 10,000 lb per hour. Mixer is self-cleaning, and has close tolerance operation between paddle tips and chamber wall.



Mixer can handle up to 10,000 lb per hour

Description: Ten hp motor normally provides necessary power for mixer. Up to 20 hp can be accommodated to handle more difficult materials. Units are built of carbon or stainless steel and may be jacketed for heating or cooling. They are designed for portable or stationary installation.

(Turbulizer is product of The Strong-Scott Mfg. Co., Dept. CP, 451 Taft St. N.E., Minneapolis 13, Minn. . . . or for more information check 5298 on form opposite last page.)



Cork Overcoat for a CO₂ Vessel

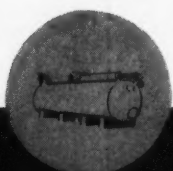
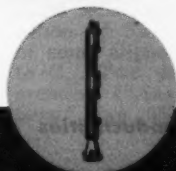
We've never been inside a loaded CO₂ vessel, but we know it has to be cool—real cool.

Kept cool and under pressure CO₂ remains in a liquid state, but a temperature rise causes a pressure build-up resulting in loss of product which is highly undesirable. The men in the photo above are helping these vessels into a cork overcoat. First we fabricated the vessels—complete with refrigeration coils—then ap-

plied the cork insulation. Auxiliary equipment such as refrigeration unit, vaporizer, valves and safety devices were assembled into a compact control panel mounted to the vessel. So you see, fabrication is only a part of the work we do at Chicago Steel Tank Company.

Throughout more than 50 years, clients in many industries have utilized our versatile manufacturing experience and facilities to produce other than the usual fabricated products. We can do the same for you.

Write today for our new facilities booklet.



Fabricators and erectors since 1899
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NEW filter bulletin is ready to mail to you

12 pages of data on Niagara vertical leaf pressure filters for liquid clarification and solids recovery. Completely new bulletin contains sections on . . . how these filters operate . . . which model you need . . . design features and modifications . . . leaves . . . accessories . . . sizes, capacities, dimensions . . . and special Niagara services. It will come to you by return mail.

SEND FOR YOUR COPY NOW

Niagara FILTERS

A DIVISION OF

American Machine and Metals, Inc.

Dept. CP-857, EAST MOLINE, ILLINOIS

Kwakelpad 28, Alkmaar, Holland

Yes, mail 1 copy of your new 12-page catalog for me and
copies which I'll give to my interested associates.

NAME AND TITLE

COMPANY

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CITY

ZONE

STATE

SPECIALISTS IN LIQUID-SOLIDS SEPARATION

When inquiring check 5300 opposite last page

cp BRIEFS from contemporary publications

Abstracts of pertinent articles in other industrial publications . . . selected by CP editors as a service to you

Dust explosions

Recent research on dust explosions is summarized. Topics covered include effect of moisture on explosions, flame velocity, explosions by venting, quenching incipient explosions, and preventing secondary explosions. Five pages, three tables, five figures, nine references. ("Chemical Engineering Progress," March 1957, page 107.)

Protecting pipelines

From England comes this treatment of cathodic protection of pipelines. Effects of design, of spacing of installations along the pipeline, resistance of pipe coating, resistance of pipeline metal, and distance of ground bed from pipeline are included. Five pages, nine figures. ("Petroleum," April 1957, page 135.)

Radioactive dynamite

A small amount of antimony-124 is used to make dynamite radioactive. Application of such dynamite as a safety measure in mining operations is covered. Four pages, three tables, two figures, two references. ("Canadian Mining and Metallurgical Bulletin," March 1957, page 117.)

Thermal conductivities

Thermal conductivities of evacuated and gas-filled insulation systems were studied. Special attention was given to mixtures of carbon dioxide and hydrogen and to mixtures of "Freon-12" and air in connection with fibrous glass. Five pages, three tables, five figures. ("Refrigerating Engineering," April 1957, page 57.)

Technical reports

Technical reports in the paper industry are discussed under headings of definitions, types, and distribution. Two pages. ("Southern Pulp and Paper Manufacturer," May 10, 1957, page 54.)

Vapor-liquid equilibrium

A new apparatus, a modification of the recirculation type, and a method for determining vapor-liquid equilibrium are described. Data for allyl alcohol-water and acetone-methanol systems are given. Four pages, five figures, two tables, nine references. ("Industrial and Engineering Chemistry," March 1957, page 411.)

Corrosion of steel

Laboratory conditions were carefully controlled during this study of relationships between corrosion rate of steel, agitation, electrode potential, concentration of dissolved oxygen in water, and current density for cathodic protection. Differential aeration is discussed in detail. Nine pages, one table, 11 figures, 26 references. ("Corrosion," April 1957, page 35.)

Synthetic fuels

The US Bureau of Mines has done extensive research and development in production of synthetic liquid fuels. This review covers oil from coal by the Fischer-Tropsch synthesis, a gas synthesis pilot plant, underground gasification, oil from shales, and catalytic synthesis of methane. Eight pages, four tables, four figures, three references. ("Coke and Gas," March 1957, page 96.)

Atomic energy

Trends in the use of atomic energy are traced under headings of Nuclear Congress, foreign commerce, world power, atomic centers, and developments in nuclear power. Four pages, one table. ("Southern Power and Industry," April 1957, page 54.)

Sulfur in steel

Installation of special equipment for rapid desulfurization is recommended to American steel manufacturers. Steel refining practices, effect of ingot practice, maximum sulfur recommended, and special refining equipment are discussed. Seven pages, three figures. ("Metal Progress," March 1957, page 65.)

Flocculation

Flocculation and aids to flocculation, where purification of water is concerned, are discussed under headings of equipment, hydraulic characteristics, mechanism, jar tests, and coagulation. Operating suggestions are given. Nine pages, 19 references. ("Journal of the American Water Works Association," March 1957, page 242.)

Paper drying

Laboratory investigation of factors that affect drying of paper is described. Instruments and measurements of important variables in mill are covered. Six pages, nine figures. ("Pulp and Paper Magazine of Canada," April 1957, page 159.)

Drying fibrous sheets

Mechanism of hot-surface drying of fibrous sheets was studied through measurement of moisture content by beta-ray transmission. Dyes were also used to determine migration of liquid within sheet. Seven pages, two tables, eight figures, six references. ("Chemical Engineering Progress," April 1957, page 174.)

Cottonseed oil

At wide ranges of pressure, temperature, concentration of nickel catalyst, and agitation, cottonseed oil was hydrogenated in a dead-end hydrogenator. Rate of hydrogenation was directly proportional to concentration of catalyst and to pressure, and was linear with temperature. Surface reaction between physically adsorbed unsaturated fats and chemisorbed atomic hydrogen is an important feature. Seven pages, two tables, nine figures, 22 references. ("Industrial and Engineering Chemistry," May 1957, page 825.)

Electrical insulation

Nylon and Terylene offer important advantages for electrical insulation. Article also covers role of asbestos for similar purposes. Two pages. ("Textiles in Industry," March/April 1957, page 27.)

Sea water corrosion

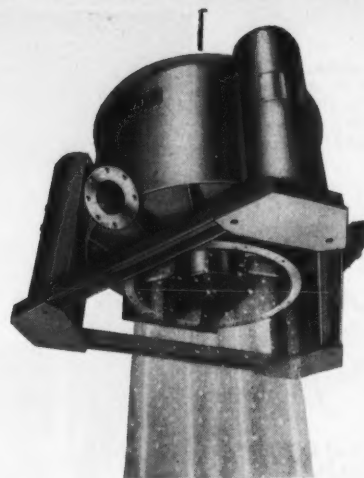
Solutions of sodium chloride differ from natural sea water when used to study corrosion. Composition of a synthetic sea water satisfactory for such purposes is given. For corrosion of copper alloys a correlation of tests made with natural and synthetic sea water is presented. Twelve pages, four tables, 26 figures, 28 references. ("Corrosion," May 1957, page 33.)

Chromatography

Paper chromatography enables separation and identification of 3,5-dinitrobenzoates or some aliphatic alcohols, C_1 to C_{12} . Two pages, four references. ("Analytical Chemistry," May 1957, page 851.)

Titanium and zirconium

From England comes this description of the van Arkel or iodide process for refining titanium and zirconium. Seven pages, four figures, 27 references. ("Metallurgia," May 1957, page 225.)



Tolhurst centrifugal cuts
48 processing
hours down to 8



In a leading chemical plant, one Tolhurst Batch-Master centrifugal is now processing the same volume of fine organics in 8 hours as two other centrifugals formerly did in 24 hours. The reason: Tolhurst's hydraulic unloader and bottom discharge unload the solids in just 30 seconds. The other batch centrifugals with manual unloading took 15 minutes or more. And Tolhurst labor savings on the job amounted to 16 manhours a day.

MAIL COUPON TODAY

Tolhurst CENTRIFUGALS

A DIVISION OF

American Machine and Metals, Inc.

Specialists in liquid-solids separation

Dept. CPT-857, EAST MOLINE, ILLINOIS

Send your free 4-page Bulletin TC-14-56 giving full data on Batch-Master Centrifugal.

NAME AND TITLE

COMPANY

ADDRESS

CITY

ZONE STATE

When inquiring check 5301 opposite last page

This SWECO-built stainless-steel catalyst activator operates at red heat in producing polyethylene for Celanese Corporation of America.

High-Level Service for Low-Pressure Plastics

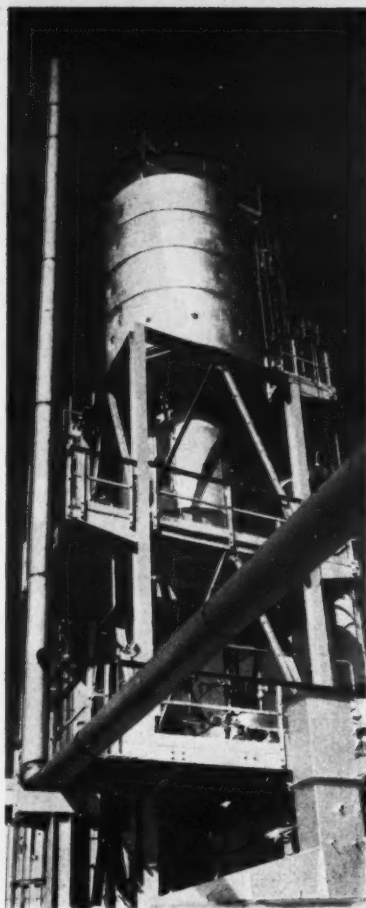
SWECO process equipment helped Celanese Corporation clear the first hurdle in the high-density polyethylene race.

Exacting, high-temperature service for the hottest race in the plastics industry. That's what Celanese Corporation of America had to have to compete with other major chemical companies bidding for leadership in the production of new high-density polyethylene.

SWECO's Manufacturing Division built the stainless-steel catalyst activator and the shell and tube heat exchangers that helped Celanese get into the running. The Celanese Houston (Texas) plant, completed last February by C. F. Braun & Co., Alhambra, Calif., is pouring out spaghetti-like streams of polyethylene at the rate of 100,000 lb. a day.

Operates at red heat

The SWECO-built catalyst activator, designed for red heat operation, is used to activate catalyst for the low-pressure plastic. The new polyethylene retains its strength at the boiling point of water, is stronger and more resistant to heat than polyethylene of low-density, high-pressure manufacture.



Experience: 40 years

The Celanese project is another example of how SWECO — with more than 40 years of experience — serves the process industries...through the design and manufacture of process equipment such as heat exchangers, pressure vessels, steam jet ejectors and surface condensers...and through engineering and construction services and a complete line of vibrating screen separators.

If your processing needs are related to the exacting techniques and developments of the chemical industry or petroleum refining, write today for complete information on SWECO process equipment. Ask for Brochure M-6-3.



Southwestern Engineering Company

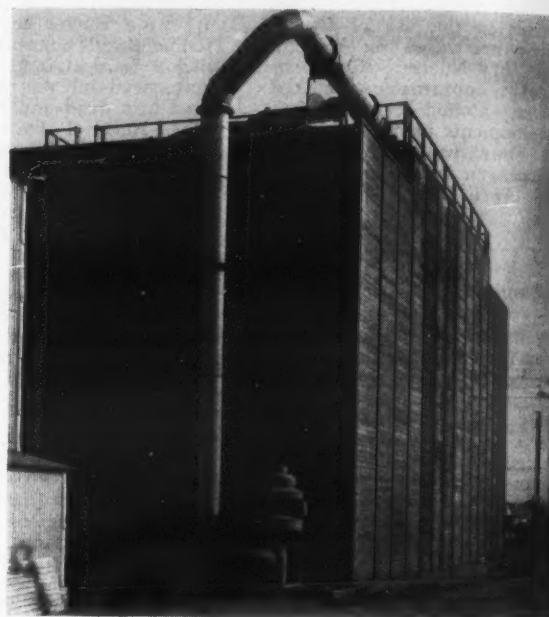
4800 Santa Fe Ave., Los Angeles 58, Calif.
Engineers & Constructors...Manufacturers

When inquiring check 5302 opposite last page



PLANT ENGINEERING & MAINTENANCE

... electrical & mechanical developments



Corrosive hydrogen sulfide and sulfur dioxide gases in water haven't hurt this redwood cooling tower in service at Gaylord Container. Pumps, piping, nails and bolts used with tower are stainless steel.

Redwood cooling tower resists corrosive

Of four towers in use at paper plant, two are in services considered unique. Performance of all four has been excellent

GORDON WEYERMULLER, Associate Editor

With **F. C. RATLIFF**, Process Engineer
Gaylord Container Corporation
Div. of Crown Zellerbach Corporation
Bogalusa, Louisiana

All non-condensable gases cooked out of black liquor during evaporation — such as hydrogen sulfide and sulfur dioxide — end up in the cooling water. This corrosive water is being satisfactorily handled by a cooling tower in service at the Bogalusa plant of Gaylord Container.

Plant erected this 37 x 86 x 44' high tower in 1953 for

what is considered a very unique service. Tower handles 18,500 gpm of sulfate process evaporator cooling water. Condensers on black liquor evaporator are direct-contact or jet-type units. Corrosive gases in the water made it necessary to go to stainless steel for pipes, pumps, nails and bolts used in connection with this tower.

This tower is unusual which c

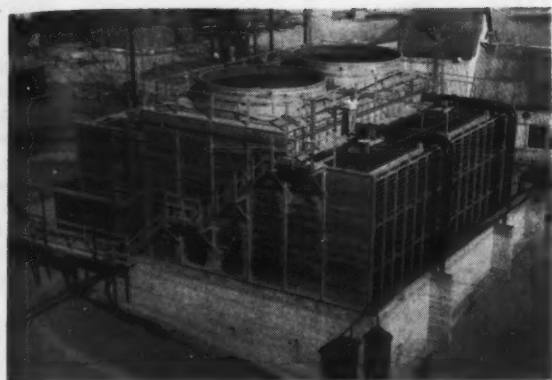
One of towers placed at Gaylord which cools of power water from F. It was 19

black

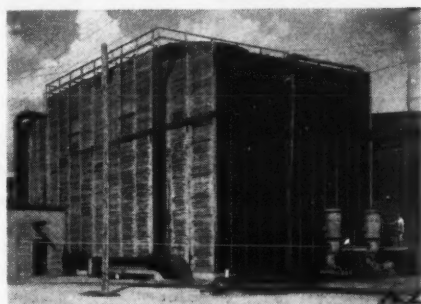
The redwood holding u is consid

A second in a unit to cool v chine va cooling v removal, a ices. As is the fi country services. 1954, co from 11

This new to c costs. C been v "primeo system white w bacterio plant ha this by riological



This tower has been a success as a water conservation measure. It is unusual for a tower to handle the vacuum pump cooling water which contains paper machine white water, as is done by this unit



One of the latest towers placed in service at Gaylord is this unit which cools 16,000 gpm of power condenser water from 110 to 95° F. It was installed in 1954

black liquor gases

The redwood appears to be holding up well and the tower is considered a success.

A second cooling tower, also in a unique service, is used to cool water from paper machine vacuum pumps, bearing cooling water, condensate removal, and other cooling services. As far as is known, this is the first installation in the country in this particular services. Tower, installed in 1954, cools 6000 gpm of water from 110 to 90°F.

This second tower is too new to determine maintenance costs. Only difficulties have been with vacuum pump "primeovers" infecting the system with paper machine white water. This shows up as bacteriological slime. So far, plant has been able to control this by chlorination and periodical washups.

Third cooling tower, which is the first of the four cross-flow units to be placed in service at Gaylord, was erected in 1937 to cool power condenser water from 50,000 lb/hr of steam. This tower, 48 x 32 x 25' high, cools 5600 gpm of water from 107 to 90°F. Plant had excellent service from this tower, which was rebuilt several years ago.

The fourth cooling tower in service at Gaylord was installed in 1954. It is also used for power purposes. This 36 x 86 x 44' high unit cools 16,000 gpm of water from 110 to 95°F.

(Cooling towers are product of The Marley Company, Dept. CP, 222 W. Gregory Blvd., Kansas City 14, Mo. . . or for more information check 5303 on form located opposite last page.)

We've been asked...

"WHAT IS THE JOY LIMBEROLLER BELT CONVEYOR IDLER?"

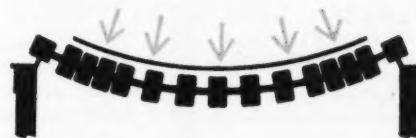


JOY LIMBEROLLER BELT CONVEYOR IDLER

CONVENTIONAL IDLER



Radically different from all other idlers, the Limberoller is a flexible steel cable suspended between two bearings... to which neoprene discs are molded... forming a single roll idler which turns on its own axis. This imparts a flexing action which is self-cleaning... prevents material buildup, a source of trouble with conventional idlers.



Supports the belt throughout its entire width... doesn't have the unsupported gaps left between the rolls like conventional idlers. Increases belt life 20% and more. Materials don't "bump along" from idler to idler, either.



Two bearings, instead of six. They are up out of the dirt zone, not hiding down under the belt. Joy has never replaced a single bearing due to normal failure. Heard enough? There's more... get the whole story from Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa. In Canada: Joy Manufacturing Company (Canada) Limited, Galt, Ontario.

JOY

...EQUIPMENT FOR ALL INDUSTRY

W5W L6831-160 Write for free bulletin 160A-80

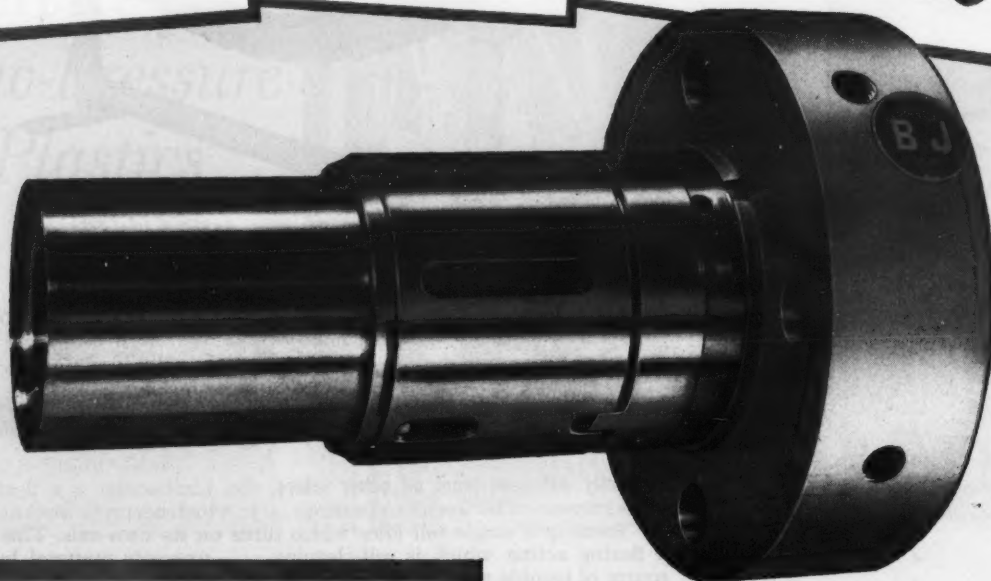
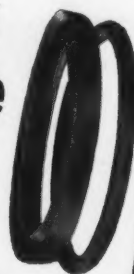
CONVEYORS • AIR AND GAS COMPRESSORS • FANS • BLOWERS • ROCK DRILLS • BLAST HOLE DRILLS
HOISTS • ELECTRIC PLUGS, RECEPTACLES AND POWER DISTRIBUTION SYSTEMS

When inquiring check 5304 opposite last page

This **ONE**
BJ
Mechanical
Seal...

Answers
THREE
Pumping
Services...

With only
the change
of
GASKETS!



1

HIGH OR LOW TEMPERATURES

The BJ *ASBESTOS* GASKETS handle temperatures from minus 100°F to plus 650°F.

2

CORROSIVE

The BJ *TEFLON* GASKETS answer a wide range of corrosive fluids.

3

HIGH PRESSURE

The BJ *RUBBER* GASKETS handle pressures to 1000 PSI... and any general service needs.

This *one* basic Byron Jackson Type U Mechanical Seal solves *three* major pumping services with only the change of two gaskets. You benefit because: (a) you can *standardize* on this basic BJ Type U Seal and thus greatly reduce your parts and inventory needs; (b) you can convert process pumps to changes of service with only the change of two gaskets; and (c) you *eliminate* costly, troublesome stuffingbox repacking and unnecessary pump downtime.

Only Byron Jackson...the leader in Mechanical Seals...offers this simplified interchangeability of service through a change of gaskets.

If your operations involve multiple pumps with variations in service requirements, look into this basic BJ Type U Seal. If your pumping needs are more highly specialized in any one field, there's a BJ Mechanical Seal engineered to solve almost every stuffingbox requirement.

FREE MECHANICAL SEAL SELECTION PORTFOLIO—Send for this special Byron Jackson Mechanical Seal Selection Portfolio. Includes size, material, price and installation information. Write today to:



Byron Jackson Pumps INC.

BJ

A Subsidiary of Borg-Warner Corporation
P.O. Box 2017A, Terminal Annex
Los Angeles 54, California

When inquiring check 5305 opposite last page

ENGINEERING

Zinc-clad aluminum eases soldering

Many problems associated with smooth and economical soldering of heat-exchanger equipment may be solved with use of zinc-clad aluminum alloy, now available in commercial quantities. Fabricated with one or both sides clad, and in coil or flat sheet form, product is reported to bring aluminum within range of ease of solder ability of copper.

(Alcoa soldering sheet is product of Aluminum Co. of America, Dept. CP, 1501 Alcoa Bldg., Pittsburgh 19, Pa. ... or for more information check 5305A on form opposite last page.)

Tough concrete coating withstands chemicals, impervious to water

Material is spark-proof, stops dusting

Uses: For sealing, damp-proofing, and preventing water seepage through concrete floors in industrial plants and other locations.



Protective coating for concrete can be applied by brush, squeegee, or spray

Features: Coating is claimed to withstand attacks of most chemicals used in industry. It is impervious to water, and resistant to petroleum derivatives. It is spark-proof, stops dusting nuisance, and is easy to clean.

Description: Suitable for use in existent buildings or in new construction, method employs two coats of coating surface seal. Prior to application of coating, special primer is used to neutralize concrete surface. Both primer

Exploring new frontiers in
**BORON
CHEMISTRY**
Second in a series



BORON SHAPES for control rods and shielding in nuclear reactors, supplied through our National Northern Division, West Hanover, Mass.

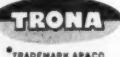
ELEMENTAL BORON

To meet your growing requirements, **TRONA*** offers a versatile selection of these standard and special grades...

STANDARD 90-92% AMORPHOUS	SPECIAL HMC HIGH MAGNESIUM
SPECIAL MGR MAGNESIUM REACTIVE	SPECIAL NAR SODIUM REACTIVE
HPA 95-97% HIGH PURITY AMORPHOUS	

The selectivity available to you with Trona Elemental Boron is the natural result of AP&CC's long pioneering leadership in Boron Chemistry. If you're concerned with the many new development possibilities of Elemental Boron — its Ordnance uses, high temperature applications or nuclear aspects — we suggest you call your nearest Trona representative, or write

MARKET
DEVELOPMENT
DEPARTMENT



**American Potash
& Chemical Corporation**

3030 West Sixth Street | 99 Park Avenue
Los Angeles 54, Calif. | New York 16, New York

When inquiring check 5306
opposite last page

ENGINEERING

and coating can be applied by brush, squeegee, or spray.

Coating consists of coal tar pitch dispersed in water by means of combination of irreversible mineral colloids under close laboratory and production control. It will not rot or disintegrate below grade, or permit fungus growth. Coating is available in 5-gal cans and 30- and 55-gal drums.

(Jennite J-16 is product of Maintenance Inc., Dept. CP, Wooster, Ohio. Check 5307 on form opposite last page.)

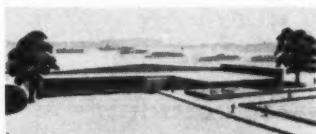
**Spans 100-ft-wide areas
without using posts
or trusses**

Wide open building interior permits unrestricted layout

Uses: For factories, warehouses or other industrial building applications.

Features: Low pitch steel framework is specially designed, yet so strong it can span floor areas up to 100 ft wide without use of any interior posts or roof trusses.

Description: Low profile steel frames are pre-engineered and mass produced to fit together perfectly and speed construction time. Building has roof pitch of 1 in 12. Exterior walls can be metal or any traditional materials, including large expanses



Low-profile, pre-engineered metal building has roof pitch of 1 in 12

of glass. Walls are non-load bearing. Interiors are wide open, permitting unrestricted layout planning, partitioning, illumination, heating, and decoration.

(Industrial buildings are product of Butler Mfg. Co., Dept. CP, 7400 E. 13th St., Kansas City 26, Mo. . . . or for more information check 5308 opposite last page.)

in Mesh with
Industry...

JELLIFF

Wire Mesh

Specializing in the
non-ferrous metals in counts to
200 x 200 or 50 x 750 and
widths up to 48" in all
commercial weaves

... FOR
76
YEARS

address your enquiries to Department 27



**THE C. O. JELLIFF
MANUFACTURING CORP.**
SOUTHPORT • CONNECTICUT • USA

When inquiring check 5309 opposite last page

NEW... IMPROVED... dustex collector

... solves more recovery problems
and assures peak efficiency

NOW, a major design improvement on the widely used and highly regarded DUSTEX Collector means bigger returns on your investment.

ALL NEW TUBE DESIGN — Longer, larger cast tube produces the following results...

- Greater capacity with less air flow resistance
- Higher abrasion resistance
- Ability to handle inherently sticky materials
- Self-cleaning action
- Highest efficiency ever

ALREADY PROVEN in numerous field tests on the most difficult dusts, the new improved DUSTEX Collector is ready to go to work for you now. Write for descriptive literature and details today.



P. O. BOX 2520

BUFFALO 25, N. Y.

When inquiring check 5310 opposite last page

Introducing the new

HAMER

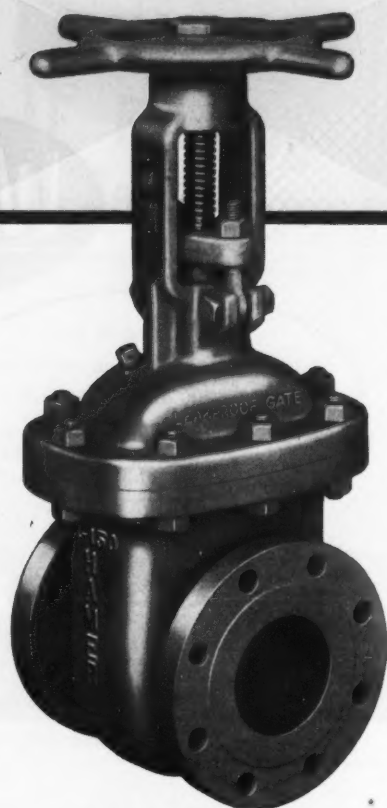
Leakproof

GATE

VALVE

*Impenetrable
Shut-off
Upstream
—Downstream*

This new Hamer Gate Valve incorporates a double sealing action design that's both absolute and fool-proof. In addition to the precision metal to metal fit of the wedge, the Hamer Gate Valve incorporates two Teflon® seal rings which compress dead tight against the wedge. Thoroughly proven under the most rugged field condition tests, the Hamer Gate Valve with its positive shut-off both upstream and downstream, eliminates the need for a double block and bleed in piping installations.



Hamer Gate Valves incorporate a new high standard of valve production. Stainless steel valve seats are welded-in for accurate fit. Locking rings are of corrosion resistant stainless steel. And precision finish on critical parts assure a smooth operating valve even after years of hard service. Write today for literature. See for yourself why Hamer Gate Valves are truly a valve without equal.

Double Sealing Action forms Impassable Shut-off

TEFLON SEAL RINGS... Renown for their inert characteristics, these Teflon seal rings have amazing durability even under the most adverse of service conditions.

PRECISION FINISHED GUIDES... Wedge guides are machined to exacting tolerances. Eliminates chatter and wear caused by line pulsations, accurately centralizes the wedge between the seats.

*RTM DUPONT

Send for Gate Valve Catalog ▶

Hamer

VALVES INC.

P. O. Box 1851

2919 Gardenia Ave., Long Beach 1, Calif.
Representatives throughout the World



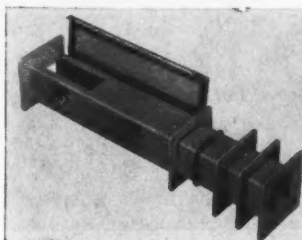
ENGINEERING

**Wireway fitting
is adjustable —
1 1/2 to 13 1/2"**

Uses: For use on machinery or buildings where oil and dust are problems.

Features: Length of assembly can be adjusted between 1 1/2 and 13 1/2".

Description: Oil-tight telescoping wireway fitting is 15 1/2" long. It is made of 14-gage steel, except for welded end flange and two sliding sleeves which are 11-gage



Telescoping wireway fitting partially assembled into 1' straight section

steel. After unit is adjusted to proper length, "O" ring gasket and two sliding retainer plates are bolted to end flange of straight section, forming an oil-tight junction.

(Telescoping wireway fitting is manufactured by Hoffman Engineering Corp., Dept. CP, 1807 Tyler St., Anoka, Minn. . . or for more information check 5312 on convenient Reader Service slip opposite last page.)

**Moldable insulation
resists temps
over 500°C**

Ceramoplastic is radiation resistant, lighter weight

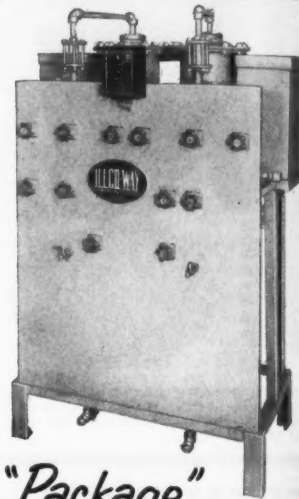
Uses: For high-temperature, quality components in equipment applications requiring reliability under extreme conditions.

Features: Material will withstand continuous operating temperatures in excess of 500°C. It is dimensionally stable, radiation resistant, and lightweight.

Description: Moldable, ceramoplastic insulating mate-

ILLCO-WAY

ionXchange



"Package"

**DE-IONIZER
PROVIDES
PURIFIED
WATER**

Here is a complete de-ionizer, all assembled, loaded with resins, and ready to be attached to supply, outlet, and drain lines. Whenever you need low-solids water, you should first plan on the de-ionization process to obtain it, and then consider the outstanding economy, efficiency, and easy installation of an ILLCO-WAY "Package" Unit. Three models are available, each in a wide range of standard sizes: LU Models produce a low-solids water for general use, down to 3 to 5 ppm, but not removing silica or CO₂; HB Models produce quality water usually less than 3 ppm and remove all ions including silica and CO₂; MB Models produce an extremely pure effluent, less than 1 ppm, free of silica and CO₂. Write for literature giving complete details.

ionXchange

ILLCO-WAY

ILLINOIS WATER TREATMENT CO.
840 Cedar St. Rockford, Ill.
New York Office: 141 E. 44th St., New York 17, N.Y.
Canadian Dist.: Pumps & Softeners, Ltd., London, Ont.

When inquiring check 5313
opposite last page

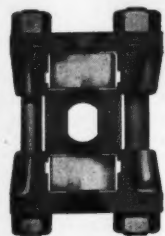
CHEMICAL PROCESSING

When inquiring check 5311 opposite last page

Strahman

HIGH PRESSURE GAUGES

USED IN
REFINERIES
AND
CHEMICAL PLANTS
THROUGHOUT
THE WORLD



THRU VISION



REFLEX

Single or Multiple
Sections

TUBULAR

Gauge Cocks
Large Chamber
Reflex Gauges
Heated or Cooled
Gauges

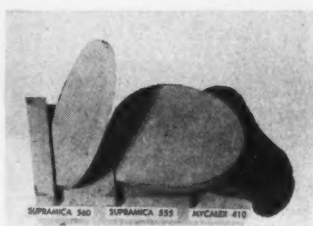
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COMPLETE
CATALOGUE

STRAHMAN VALVES, Inc.
16 Hudson St., New York 13, U.S.A.

When inquiring check 5314
opposite last page

AUGUST 1957

ENGINEERING



Ceramoplastic insulating material withstands high temperatures, can be precision molded

material can be precision-molded to very close tolerances. Because of thermal expansion coefficients closely matching those of steel, functional or reinforcing inserts may be molded in without risk of loosening and resultant corona. Properties of insulating material are:

Dielectric constant at	
1 meg	6.8
Volume resistivity	
ohm-cm	5×10^{13}
Specific gravity	2.8
Water absorption,	
24 hr	Nil
Hardness (Rockwell M)	125
Thermal expansion,	
/°C at 20°C	13×10^{-4}

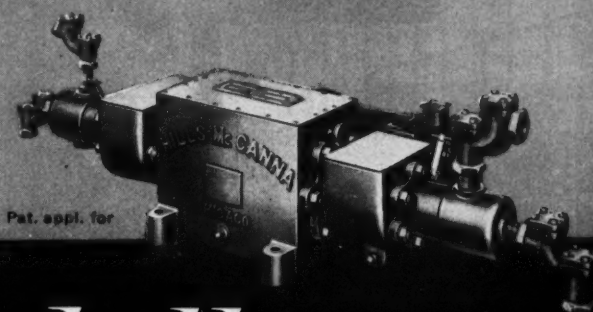
(Supramica 560 is product of Mycalex Corporation of America, Dept. CP, PO Box 311, Clifton, N.J. . . . or for more information check 5315 on form which is located opposite last page.)



Accurate Proportioning of Fluids

Hills-McCanna Metering and Proportioning Pumps

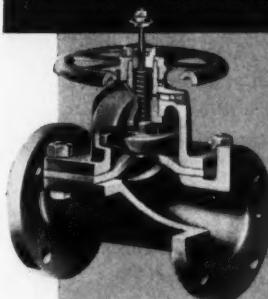
Hills-McCanna Proportioning Pumps are designed for dependable precision metering and simplified maintenance. Ranging in capacity from a few cc to hundreds of gallons per hour, they may be adapted to automatic operation. Write for the valuable booklet "Precision Proportioning Pumps" for complete information.



Pat. appl. for

hills-mcCanna company

THE PEOPLE WHO KNOW AND CONTROL FLOW

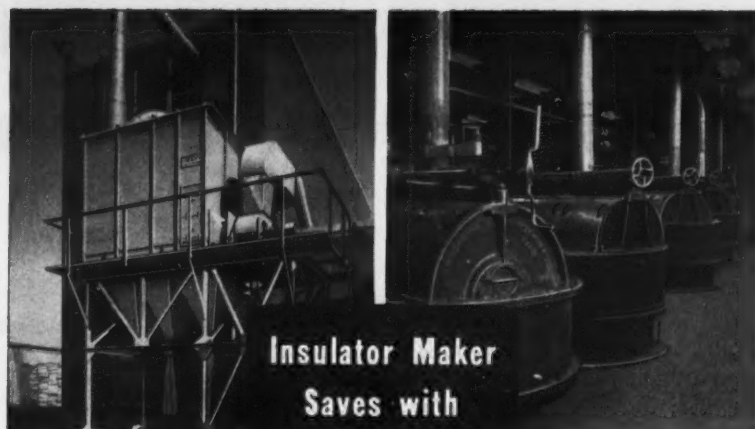


DIAPHRAGM VALVES

... provide leak-tight, dependable valve performance for corrosive services, slurries, liquids, gases, air and water; feature simplified in-line maintenance, exclusive sealing bead diaphragm. Write for informative catalog on complete valve line.

Hills-McCanna Company 2370 W. Nelson Ave., Chicago 18, Illinois

When inquiring check 5316 opposite last page

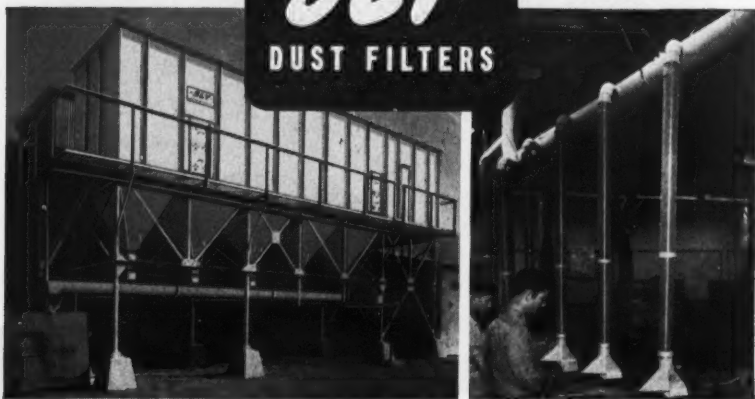


Insulator Maker
Saves with

SLY
DUST FILTERS

Sly Filter collects dust from mixers and slip house.

Dust from mixers is drawn through ducts to filter.



Sly Filter handles 32,452 c.f.m.—keeps sawing and machining operations dust-free.

No Dust Throughout the Processing Cycle

At this company, worker morale and efficiency remain high and overall plant maintenance costs low. The reason: annoying, destructive dust created in making electrical insulators cannot escape to cause discomfort to employees or damage to equipment. Three Sly Dust Filters collect *all* the dust from ball mills and slip house, from mixing machines and storage bins, and from a multiplicity of sawing and machining operations.

Learn why Sly Dust Filters offer important advantages in greater filtering capacity, space-saving installation, automatic control, easier bag replacement . . . Learn how Sly's greater experience in designing, building and installing dust collection equipment can mean substantial savings in your plant . . .

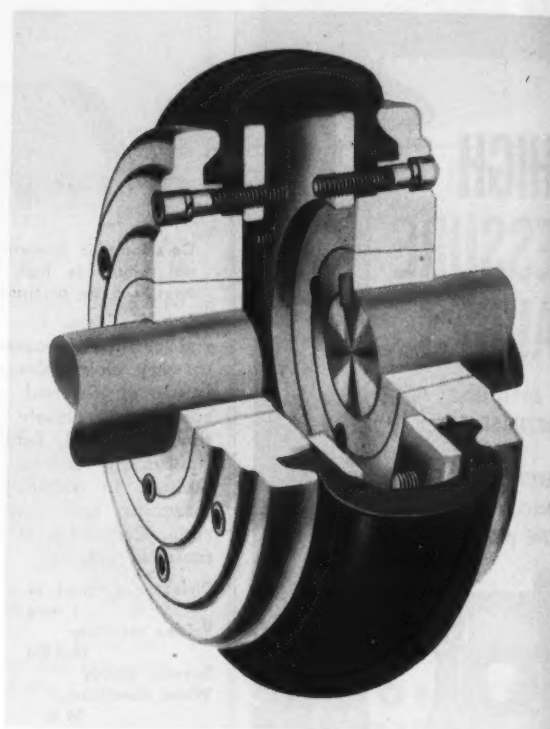
SEND TODAY FOR BULLETINS 98 and 102

Designers and Manufacturers of: Dust Control Systems,
Industrial Ovens, Blast Cleaning
Equipment, Tumbling Mills.

THE W.W. **SLY** MANUFACTURING CO.
4754 TRAIN AVENUE • CLEVELAND 1, OHIO
OFFICES IN PRINCIPAL CITIES

When inquiring check 5317 opposite last page

ENGINEERING & MAINTENANCE



Cutaway view of flexible coupling. It can be installed or replaced quickly and easily even in confined spaces

Technological advances in manufacture of automobile and truck tires have been utilized in a device developed in West Germany for transmitting power from drive to machine. Now available in The United States this . . .

flexible coupling efficiently handles misalignment

Uses: A flexible coupling member between drive and driven machine. Available in capacities up to 600 hp at 900 rpm.

Features: Flexible coupling will take angular misalignment up to four degrees, parallel misalignment up to $\frac{1}{8}$ ", and end float up to $\frac{5}{16}$ " . . . or all three simultaneously. Precise limits are contingent on size of coupling and duration of the condition. Resilience

of flexible member cushions shocks, smoothing out load. Torsional vibration is absorbed. Because there is no metal-to-metal contact, no lubrication is required, no maintenance is needed.

Description: Coupling consists of flexible tire clamped between two hubs which are mounted on shafts to be coupled. Tire is held between hubs' flanges and clamp rings. Hubs are machined to take

CHEMICAL PROCESSING



Flexing member moving



Coupling tire handles misalignment, grease, par

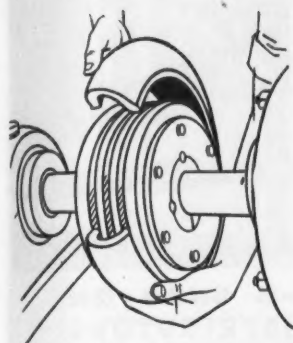
Taper-Lo permit quick installation to diameters. Tire has molded in installation without only need screws e removal of even in

Safety design. counters are finished no protr (Para-fle supplied turing Co waka, In opposite

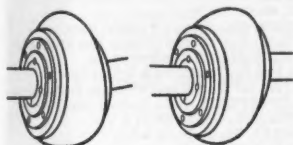
Wire sli

Features: engineering tions of contained Data and bridge V CP, Car 5319.

AUGUS



Flexing member is replaced without moving drive or driven machine



Coupling tire allows handling of angular misalignment up to four degrees, parallel misalignment to 1/8"

Taper-Lock bushings which permit quick and easy application to shafts of different diameters without reboring. Tire has a transverse split molded into it, which allows installation and replacement without moving drive. It is only necessary to loosen cap screws enough to allow removal of tire and fit a new one even in confined spaces.

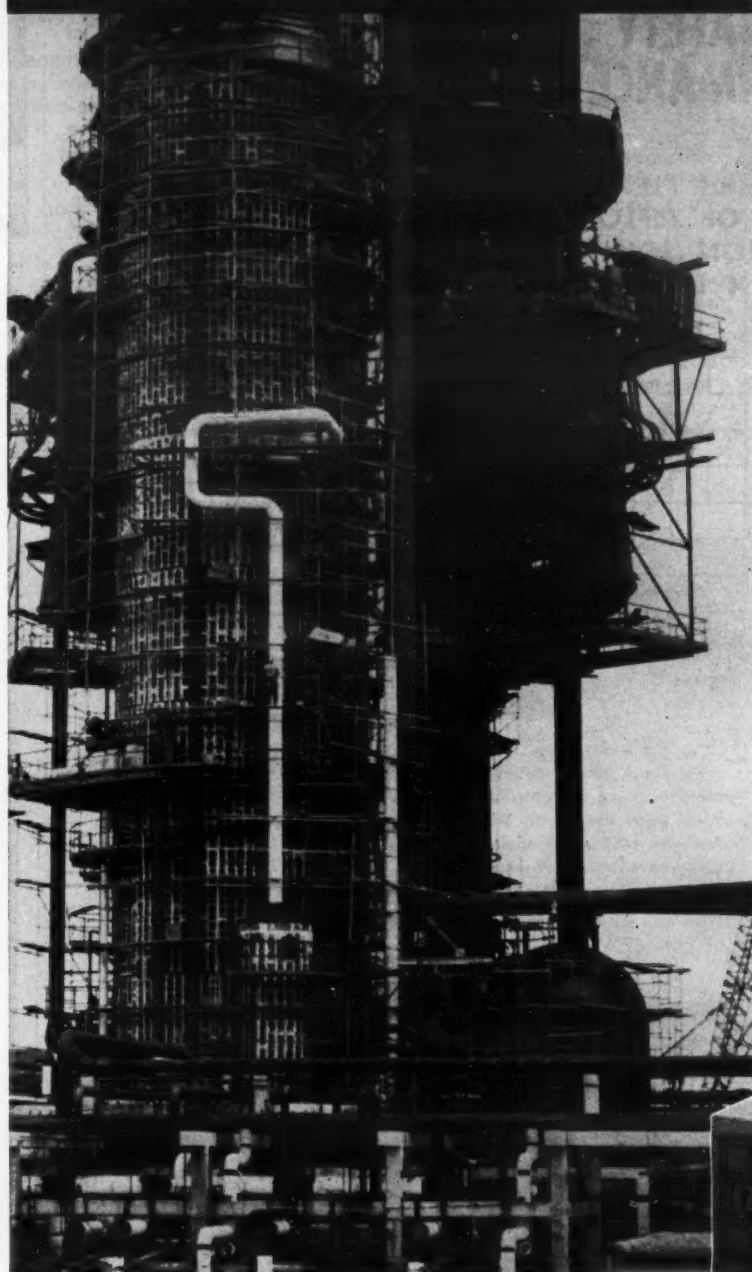
Safety is promoted by flush design. All cap screws are countersunk; metal surfaces are finished all over; there are no protruding parts.

(Para-flex flexible coupling is supplied by Dodge Manufacturing Corp., Dept. CP, Mishawaka, Ind. . . . or check 5318 opposite last page.)

Wire sling data

Features, applications, engineering data, and specifications of woven wire slings are contained in 22-page bulletin. Data and price bul — Cambridge Wire Cloth Co., Dept. CP, Cambridge, Md. Check 5319.

on World's Largest Cat Cracker at Tidewater's Delaware Refinery



BALDWIN-HILL MONO-BLOCK®

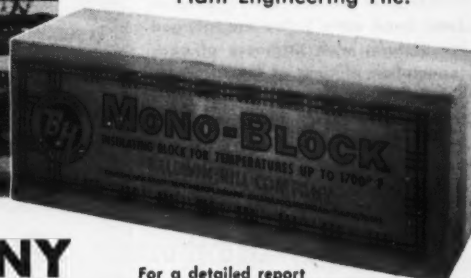
**prevents heat loss
... helps control
temperatures**

A million bd. ft. of B-H MONO-BLOCK was used on this, the largest single refinery project ever built, including the world's biggest catalytic cracking unit. It met, by a wide margin, the four primary requirements of: 1) conserving heat, 2) helping control operating temperatures, 3) protecting workers from dangerous hot surfaces, and 4) contributing to fire protection.

B-H MONO-BLOCK was selected since temperatures range from 75° to 1700° F and MONO-BLOCK provides high thermal efficiency over this full temperature range. By standardizing on this one-block insulation, C. F. Braun Co., Engineers and Constructors, simplified purchasing and warehousing . . . eliminating the need to stock special high temperature insulation.

B-H SUPER POWERHOUSE CEMENT was used to point all joints and as a single coat insulating-finishing cement saving the labor costs involved in two coat application.

See the B-H Catalog in Sweet's Plant Engineering File.



BALDWIN-HILL COMPANY

Complete Line of Industrial Insulations



408 Breunig Avenue
Huntington, Ind.

Trenton 2, N. J.
Kalamazoo, Mich. Temple, Texas

For a detailed report on the insulation of this economical installation, just staple the keyed corner of this ad to your letterhead and mail.

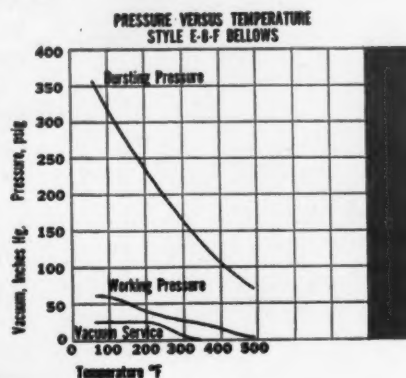
J375

When inquiring check 5320 opposite last page

DORÉ INTRODUCES NEW QUALITY CONTROL CHECKS AND CHARTS TO ASSURE OPTIMUM SAFETY AND PERFORMANCE

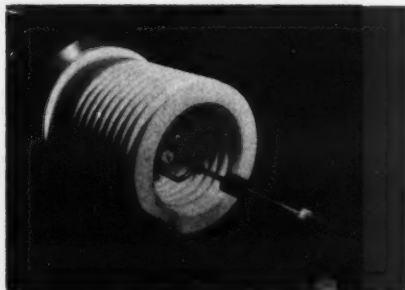
OF BELLOWS and FLEXIBLE COUPLINGS OF TEFLON* — EXPANSION JOINTS WITH TEFLON LINING

1. For the first time in the industry pressure-temperature charts showing recommended operating pressures and actual burst pressures are furnished with each Doré Bellows and Flexible Coupling of Teflon, and Expansion Joint lined with Teflon. This confirms our pre-testing — takes the guesswork out of operating conditions.



2. For the first time in the industry each Doré Bellows and Flexible Coupling of Teflon, and Expansion Joint lined with Teflon, is cycled with cold water at pressures 50% greater than recommended operating pressures prior to shipment.

3. For the first time in the industry Doré's Bellows and Flexible Coupling of Teflon, and Expansion Joint lined with Teflon are gauged for uniform wall thickness of each convolution at time of manufacture. This eliminates variation of wall thickness — the major cause of bellows rupture.



*DuPont's tetrafluoroethylene resin

IT PAYS TO GET DORÉ QUALITY CONTROLLED SHAPES OF TEFLON

John L. Doré, Co.

SALES AGENTS IN U.S.A.
FOR JOHN L. DORÉ, INC.
Du Pont's Teflon • Kellogg's Kel-F
Hi Quality Nylon

5406 SCHULER • P. O. BOX 7772 • HOUSTON 7, TEXAS

ENGINEERING

Water cooling jacket is integral feature of transducer

Permits direct contact of face with very hot liquids

Uses: For ultrasonic processing in high temperature environment; applications such as heat treating, mixing high temperature solutions, and degassing molten metals and hot liquids.

Features: Water cooling jacket, integral with transducer cooling system, permits use with emergent face directly in contact with liquids at temperatures up to 900°C.

Description: Units have internally biased, water-cooled, 400-watt average, 1600-watt peak, power magnetostrictive driving elements operating at 25 kilocycles per second. Highly stable transducers can be driven singly or in groups by appropriately rated standard ultrasonic generators from 400 watts to 10 kilowatts and above.

(Models AT-1600 B and AT-1600 C are products of Acoustica Associates, Inc., Dept. CP, Glenwood Landing, Long Island, New York . . . or for more information check 5322 on form opposite last page.)

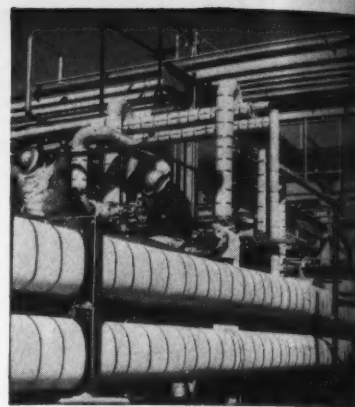
Check valves seal tight after 20 million test cycles

Units function with accuracy and no wear

After life-cycle tests in excess of 20 million cycles, check valves installed on proportioning and metering pumps showed virtually no wear.

Through all cycles, valves with "floating" O-ring seals functioned perfectly with complete accuracy to prevent leakage and possible changes in pump output.

Use of these units eliminated the need for multiple valves installed in series on suction and discharge side of pump. Changes in pumping speed, changes in viscosity, or changes in pressure may



G-B SNAP-ON DISTRIBUTORS

(See ad on facing page)

ALBUQUERQUE, Mt. States Insulation Co.
AMARILLO, Ball Distributing & Engr. Co.
ATLANTA, Ga., Southern States Iron Roofing Co.
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LOS ANGELES, Western Fibrous Glass Products
Thorpe Insulation Co.
LOUISVILLE, General Insulation & Roofing Co.
MEMPHIS, John A. Denie's Sons Co.
MIAMI, Southern States Iron Roofing Co.
MINNEAPOLIS, Asbestos Products, Inc.
MOBILE, Ala., Shook & Fletcher
NASHVILLE, Southern States Iron Roofing Co.
NEWARK, N. J., Eastern Steam Specialty Co.
NEW HAVEN, Conn., Insulation Supply Co.
NEW ORLEANS, Eagle Asbestos & Packing
NEW YORK, Eastern Steam Specialty Co.
OKLAHOMA CITY, Ball Distributing & Engineering Co.
OMAHA, Cardinal Supply & Mfg. Co.
PHILADELPHIA, John F. Scanlan, Inc.
PITTSBURGH, Dravo Corp.
PHOENIX, Ariz., Kircher Asbestos & Rubber Co.
RALEIGH, N. C., Southern States Iron Roofing Co.
RICHMOND, Va., Southern States Iron Roofing Co.
ROCKFORD, Ill., Mott Brothers Co.
SALT LAKE CITY, Bullough Asbestos Supply Co.
SAN ANTONIO, The Bracken Co.
SAN DIEGO, Western Fibrous Glass Products
SAN FRANCISCO, Western Fibrous Glass Products
SAVANNAH, Ga., Southern States Iron Roofing Co.
SEATTLE, Western Fibrous Glass Products
ST. LOUIS, A. G. Brauer Supply Co.
ST. PAUL, Asbestos Products, Inc.
SYRACUSE, N. Y., Industrial Supply Co.
TAMPA, Fla., Eagle Roofing & Art Metal Works, Inc.
TALLAHASSEE, Fla., Capital Refrigeration & Supply
TULSA, Okla., Ball Distributing & Engr. Co.
TUPELO, Miss., Paine Supply Co.
WASHINGTON, Walter E. Campbell Co., Inc.
WICHITA, Jamar-Olmen Construction Co.
VANCOUVER, B. C., Fleck Brothers Limited



When inquiring check 5321 opposite last page

Where plant production depends on temperature control— insulate with **SNAP*ON!**

The more process or steam piping you have in your plant, the more reason to use Snap*On—the one-piece pipe insulation molded of fine glass fibers. For Snap*On offers the highest thermal efficiency at the lowest applied cost of any general purpose pipe insulation on the market for cold or hot piping up to 350° F.

Thermal efficiency alone makes Snap*On the natural selection in plants where production hinges on piping—yet Snap*On offers many other outstanding advantages. It costs less to apply—"just open the seam and it snaps on the pipe." It's lighter and cleaner to work with. There is no breakage, no waste. It's permanent.

Snap*On is available in one-piece cylindrical sections . . . in sizes up to 33" . . . plain or with a complete range of factory-applied jackets for appearance, vapor barrier or weatherproofing. It is stocked for prompt delivery by a nation-wide network of G-B distributors. Use the best—it costs no more.

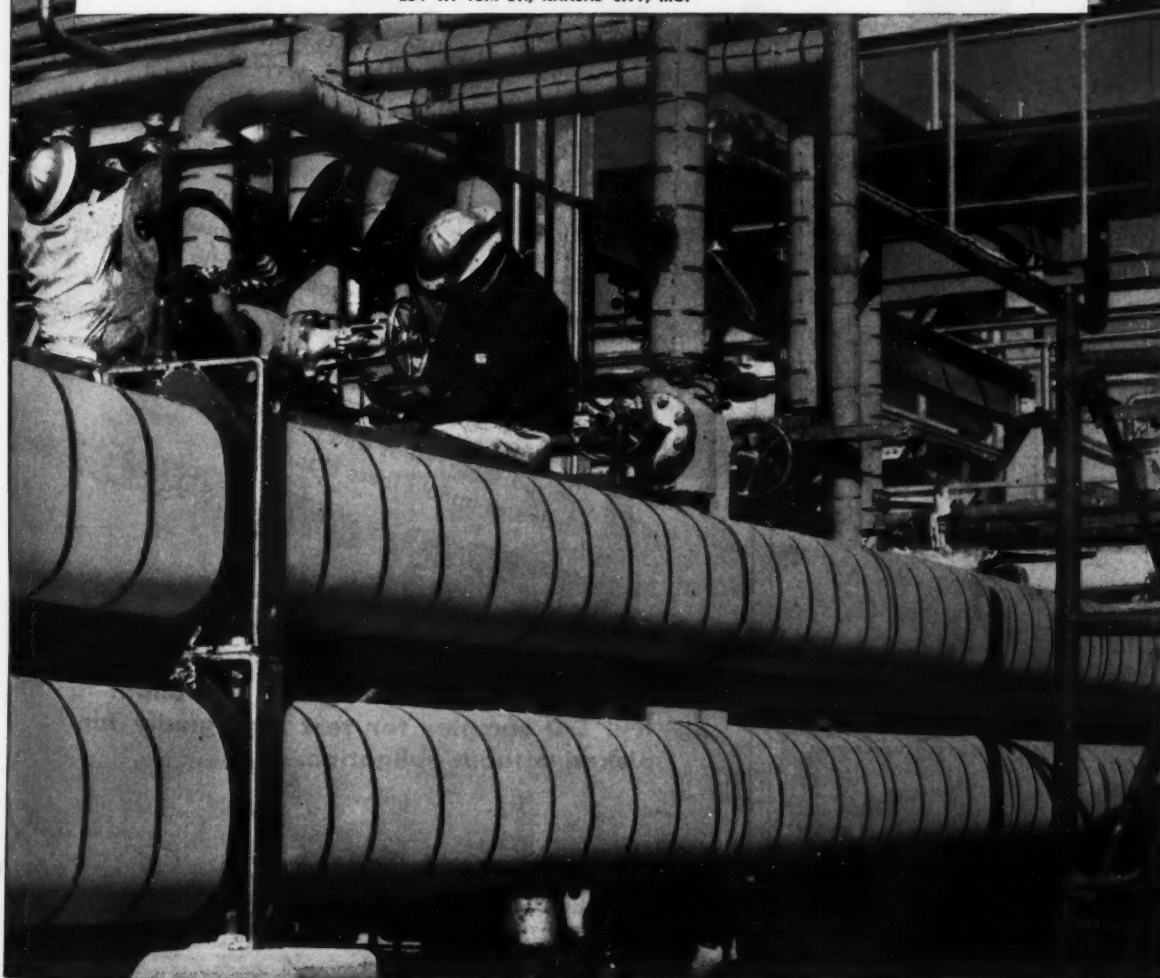
SEE ADJOINING COLUMN FOR NAME OF LOCAL DISTRIBUTOR OR WRITE FOR COMPLETE INFORMATION

*Trademark Reg.

GUSTIN-BACON *Manufacturing Company*



Thermal and acoustical insulations • Molded glass fiber pipe insulation • Pipe couplings and fittings
254 W. 10th ST., KANSAS CITY, MO.



When inquiring check 5323 opposite last page



Check valves on proportioning pump stop leakage, insure complete accuracy

cause variations in pump output if valve action is not dead tight under all conditions. Positive, trouble-free action of O-ring valves insures consistent volumetric efficiency.

(Check valves were supplied by Circle Seal Products Co., Inc., Dept. CP, 2181 East Foothill Blvd., Pasadena, Calif. . . . or for more information check 5324 on form opposite last page.)

Ion exchange softener shipped assembled ready-to-use

Minimum connections needed
for full operation

Uses: For processing water to high degree of purity.

Features: Fully-automatic units are shipped fully assembled. All gravels and resins are in place, and unit is ready for immediate operation after minimum of connections.

Description: Mixed-bed principle of ion exchange provides water free of silica and all ionizable solids with purity-meter readings of over 1,000,000 ohms per cubic centimeter. Unit consists of regular mixed-bed column or tank, with associated external and internal piping, mounted on heavy welded steel base. Automatic operation is pro-

Turn to page 192

...for straight right-angle
cuts every time...the new

RIDGE

Wide-Roll Pipe Cutter



fast true pipe cuts on your power drive

Rolls are twice the usual width,
double the bearing surface on
pipe—sure straight start
of cut . . . by hand or power
drive—extra fast and easy.
Pays you to see it before you
buy your next cutter—
at your Supply House.

No. 201, 1/4" to 1 1/4"
No. 202, 1/4" to 2"

The Ridge Tool Company, Elyria, Ohio, U. S. A.



When inquiring check 5325 opposite last page



**"CANADA DRY BEVERAGES
CHOOSE E-D FILTER PAPERS
TO GET SPARKLE AND PURITY!"**



J. L. Murphy, Jr.,
Vice-President in charge of
production for Canada
Dry Ginger Ale, Inc.

"For 30 years, we have used
Eaton-Dikeman filter papers to obtain the
sparkle and purity that are essential in
maintaining the quality for which
Canada Dry Beverages are known
and liked", says Mr. J. L. Murphy.

"Our beverages are sold to millions
of consumers each year. They are a
discriminating and exacting jury. Clarity,
flavor, sparkle must be up to top standards at
all times to hold their loyalty. Thus, in the final
stages of polish filtration, we must have a
dependable and uniform filter medium.
We have found that Eaton-Dikeman filter paper,
year in and year out, fulfills these requirements.

"In addition to fine porosity, E-D filter paper
has very high rapidity, which is a requisite
for maintaining the high production rate
of Canada Dry Beverages.

"Filtration is a very important part of our
operation. Every bottle that leaves our plant must
be sparkling, clear and pure. E-D filter paper
helps us uphold these standards."

**To get maximum clarity for your filtration,
let us recommend the grade you ought to
try. E-D samples for test runs gladly fur-
nished without obligation.**

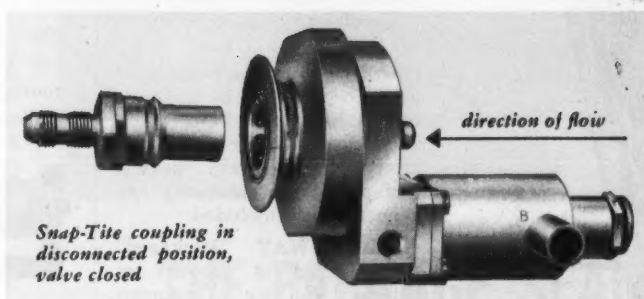


The Eaton-Dikeman Company

FILTRTOWN
MOUNT HOLLY SPRINGS, PENNSYLVANIA

When inquiring check 5326 opposite last page

SNAP-TITE REMOTE CONTROL COUPLINGS FOR GUIDED MISSILES



Here is a specially designed Snap-Tite quick-connect, quick-disconnect coupling, ideal for use in missile-fueling systems. This unit is specifically designed to be manual-connected . . . can also be disconnected manually, or by use of an air-actuated remote control.

NOT A DROP SPILLED!

When the coupling is disconnected, it spills only that small amount of fluid which clings to the metal. The valves in both the coupler and nipple automatically shut off when disconnected, *with no leakage.*

NO AIR INCLUSION!

Coupling operation encloses only a minute amount of air.

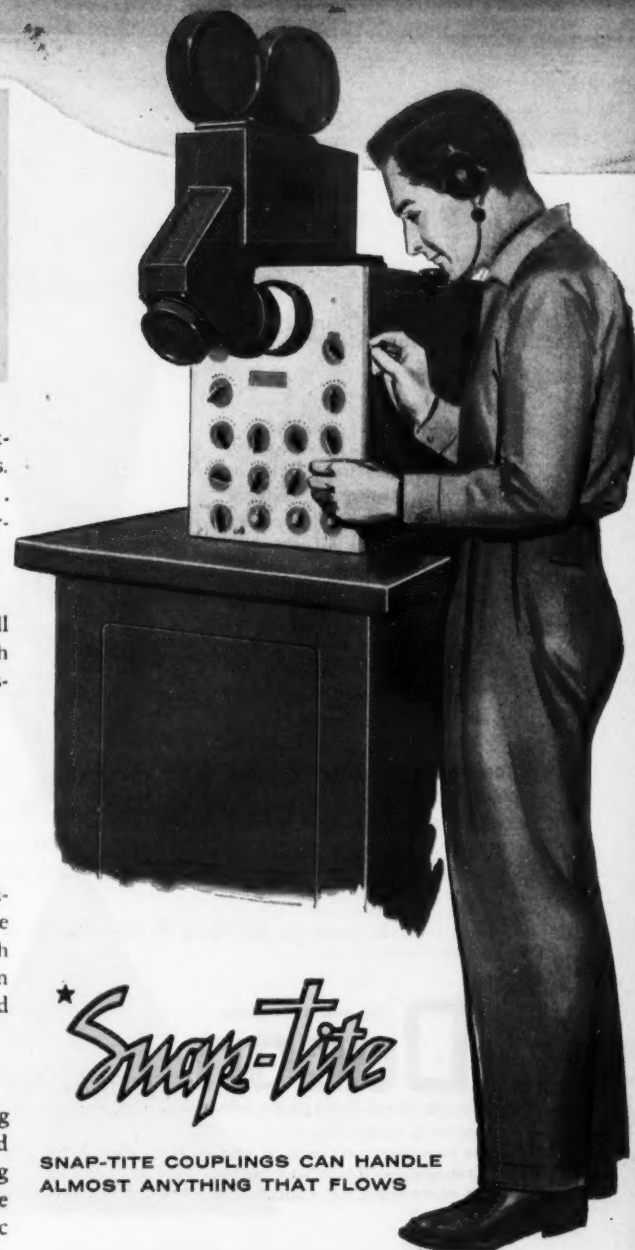
MINIMUM PRESSURE DROP!

Smooth, streamlined passages assure maximum flow.

Variations of this coupling, to meet your required specifications, can be furnished with the appropriate seals to handle liquified gasses, exotic fuels, and a large variety of fluids with working pressures up to 3,000 PSI and temperatures from -300°F to $+400^{\circ}\text{F}$. Units have been designed up to and including 5" size.

STANDARD COUPLINGS, TOO!

Your coupling needs might not be as critical as the coupling shown here, but you can be sure, when buying standard Snap-Tite couplings, that the same outstanding engineering and manufacturing skills are basic throughout the Snap-Tite line. Write for complete catalog . . . or describe your specific coupling problems. Snap-Tite, Inc., Union City 6, Pa.



★ Snap-Tite

SNAP-TITE COUPLINGS CAN HANDLE
ALMOST ANYTHING THAT FLOWS

For more information on product at right, specify 5327 see information request blank opposite last page.



Continuous, Trouble-Free Operation for...
DRY DUST CONTROL



If you're airing a dust control problem for industrial process or community relations... consider the factual benefits of field-proven Ducon Cyclones for dry collection. Hundreds of leading plants throughout the world, handling a wide variety of products, have found that Ducon dry-type collectors provide the continuous operation needed to capture nuisance dusts and recover usable product... most effectively, and with no processing down-time for sludge clearance. Consult a Ducon field engineer who may have a ready answer for your specific dust control problem.

Write today for descriptive Bulletin AH-49



Ducon

147 EAST SECOND STREET • MINNEAPOLIS, L.L. NEW YORK

Sales Representatives in Principal Cities

In Canada: The Ducon Company of Canada, Ltd. • 100 King St. W. • Toronto, Ontario

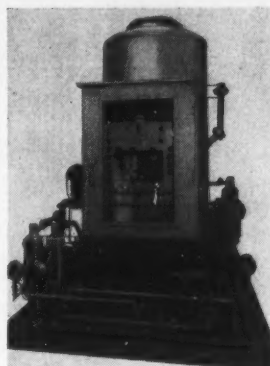
Designers and Manufacturers of Dust Control Equipment

CYCLONES • CENTRIFUGAL WASH COLLECTORS • FLOTTATION DEWASERS • SLURRY

When inquiring check 5328 opposite last page

ENGINEERING

Starts on page 189



"Packaged" ion exchange unit comes completely assembled; produces high purity water

vided by motor-operated valves, controlled by conductivity meter and program timer to govern regeneration at proper intervals. Vessels and piping for necessary regenerants are included.

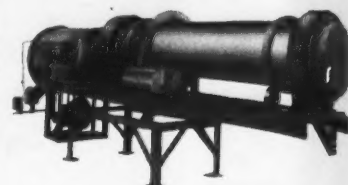
(ILLCO-WAY "Packaged" IonXchanger is product of Illinois Water Treatment Company, Dept. CP, 840 Cedar St., Rockford, Ill. . . . or for more information check 5329 on the convenient Reader Service slip which is located opposite last page.)



"When he started working on his 'dehydrated water' project, we knew it was time."

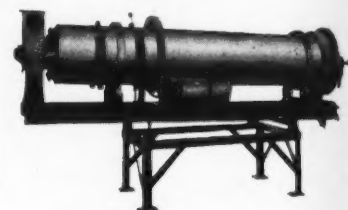
Thanks to Ken Boyea, Hercules Powder Company, Holyoke, Mass.

Ruggles-Coles
PILOT PLANT DRYERS



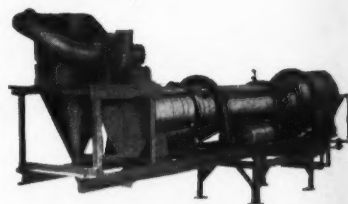
XB DOUBLE-SHELL DRYERS

XB double-shell, indirect - heat, gas - fired dryer for drying without contamination. Volatiles removed with only limited dilution. Bulletin AH-472-13.



XC STEAM TUBE DRYERS

XC steam - tube indirect heat dryer. Can be connected to any available steam supply or furnished with a 3-HP steam generator. Bulletin AH-473-13.



XH-XF SINGLE-SHELL DRYERS

XH - XF single-shell, direct-gas fired dryer. Arranged for either parallel or counter - flow operation. Bulletin AH-471-13.

HARDINGE
 COMPANY, INCORPORATED
 YORK, PENNSYLVANIA • 340 Arch St. • Main Office and Works
 New York • Toronto • Chicago • Hibbing • Houston • Salt Lake City • San Francisco

When inquiring check 5330 opposite last page

CHEMICAL PROCESSING

Resists w
 of water
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AUGU

**Resists washing action
of water insoluble
liquid solvents**

Lubrication consistency stays relatively unchanged in use

Uses: For any lubricating application that involves liquid solvents, if solvent is normally insoluble in water.

Features: Material is impervious to washing action of almost all hydrocarbon and chlorinated solvents. Its consistency remains relatively unchanged in use.

Description: Typical characteristics of solvent-resistant grease are:

Unworked penetration	340-370
Worked penetration	340-370
Dropping point	350 max
Ash content	0.5% max
Filler	None
Color	Dark Grey
Pumps readily in hand gun at	0°F

(Solvent-resistant grease No. 5266 is product of Pennsylvania Refining Co., Dept. CP, 2686 Lisbon Rd., Cleveland 4, Ohio . . . or for more information check 5331 on the convenient form which is located opposite last page.)

**Pressure drop 50% less
across globe valve
with Teflon seal**

Difficult-to-handle fluids can be controlled

Uses: Unit is designed for controlling liquid oxygen, hydrogen, and other difficult-to-handle fluids and gases.

Features: Pressure drop is approximately 50% less than with conventional globe valves. Seating arrangement consists of Kel-F or Teflon seal within metal-to-metal seat. Large orifices and streamlined flow reduce friction and erosion.

Description: Valves are available in 150-, 300-, 600-, 1500-, and 3000-lb series with flanged, screwed, or socket-welded ends in sizes from 1/2 to 8". Series can be furnished with manual-control cylinder operators, electric or air motors, or any other conventional operator. When fur-



THE PACKAGE SEAL *of a hundred uses*

This Garlock MECHANIPAK* Seal BB-21A has proved itself on hundreds of jobs, sealing against water, oils, alcohol, mild acids, and solvents. It's ideal for shafts on centrifugal pumps, automatic washers, speed reducers, commercial dishwashers . . . wherever pressures do not exceed 150 psi.

Withstands temperatures to 212° F. with standard bellows . . . shaft speeds to 2000 fpm and higher depending on operating conditions.

Sizes for 3/8" to 3" dia. shafts. Mechanical drive arrangement is engineered to eliminate slippage and simplify installation.

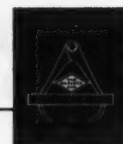
The BB-21A is another important part of "the Garlock 2,000" . . . two thousand different styles of packings, gaskets, and seals to meet all your needs. The only complete line. That's why you get unbiased recommendations from your Garlock representative. Call him today or write for Catalog AD-150.

*Registered Trademark

THE GARLOCK PACKING COMPANY, Palmyra, N. Y.

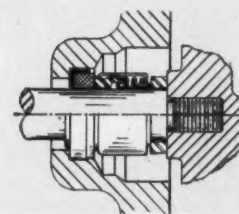
For prompt service, contact one of our 30 sales offices and warehouses throughout the U. S. and Canada.

GARLOCK

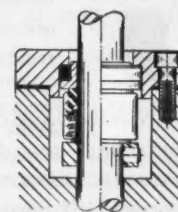


Packings, Gaskets, Oil Seals,
Mechanical Seals,
Rubber Expansion Joints,
Fluorocarbon Products

TYPICAL INSTALLATIONS



Centrifugal pump installation where stationary seal fits in housing and impeller provides stop for seal. A cup type vibration ring holds stationary seat. (Vibration ring design optional.)



Vertical shaft installation where lock-nut positions seal on shaft and stationary seat is in gland. A square vibration ring is used to hold stationary seat. (Vibration ring design optional.)

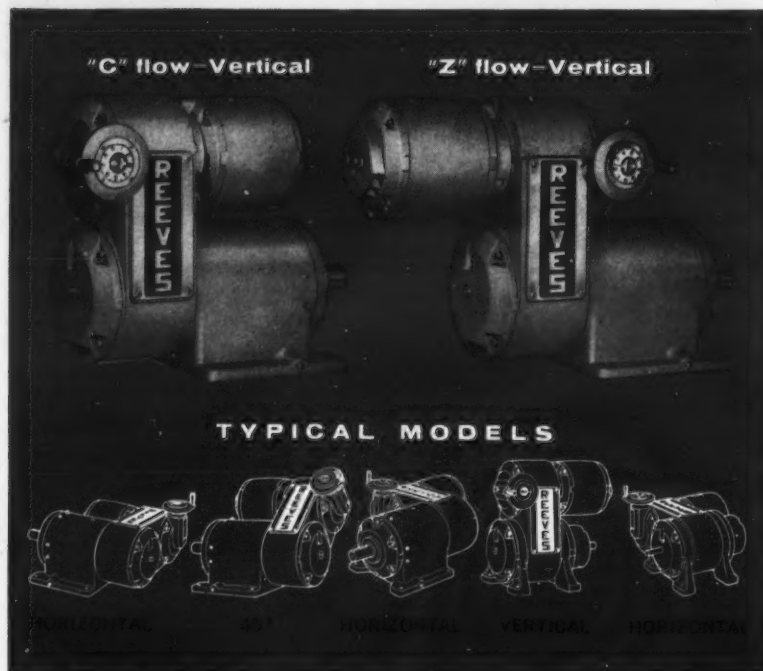
When inquiring check 5332 opposite last page

NEW

REEVES®

Sizes 200-300 Vari-Speed MOTODRIVES*

*200-300 Size, 1 through 5 hp.; full line, 1/4 through 40 hp.



The flexible design of these compact new REEVES variable speed power packages permits hundreds of combinations . . . space-saving, space-fitting *standard* assemblies to meet most installation requirements. All models are available in both "C" flow and "Z" flow styles.

New-increased capacity is built in the reducers—single, double or triple stages . . . new disc assemblies permit wider output speed ranges . . . discs are pre-aligned . . . pre-loaded spring maintains correct belt tension for longer belt wear . . . *exclusive* "close-grooving" lubrication assures free sliding discs . . . new Meter-matic system automatically lubricates the motor and variable shaft bearings.

Complete information on all phases of the versatile 200-300 sizes Vari-Speed Motodrives is given in new Catalog. Write for your free copy today—Dept. CP32-M571.

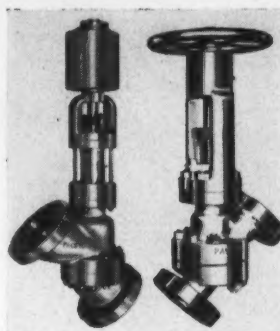
REEVES PULLEY COMPANY

Division of **RELIANCE ELECTRIC AND ENGINEERING CO.**

Columbus, Indiana

When inquiring check 5333 opposite last page

ENGINEERING



Globe valve has positive seal using Teflon or Kel-F within seat

nished with air cylinders, most sizes can be spring loaded to automatically close or open valve in event of emergency power failure.

("Y" globe valves are product of Pacific Valves, Inc., Dept. CP, 3201 Walnut Ave., Long Beach 7, Calif. . . . or for more information check 5334 opposite last page.)

Threadless pipe fittings have superior gripping with brass clutch ring

Uses: For joining steel, wrought iron, or plastic pipe in plumbing work, cuts into existing lines, oil and gas piping, and machinery and equipment lines.

Features: No threading, grooving, flaring, soldering, or welding is necessary. Superior gripping action is achieved through specially designed brass clutch ring with internal serrations which grip pipe wall as fitting nut is tightened.

Description: Threadless pipe fittings will withstand traction forces up to 3600 lb and hydro-static pressures ranging from 450 psi on 2" pipe to 5000 psi on 1/2" pipe. Neoprene gasket compressed against pipe wall enables permanent seal from leakage of gas or liquid. Resistance to abnormal vibration, contraction, or expansion is achieved.

(Threadless fittings are product of Telsco Fittings Div., Texas Lawn Sprinkler Co., Dept. CP, 5422 Redfield St., Dallas, Texas. Check 5335 opposite last page.)

What's your Problem?

EVAPORATORS

FILTERS

CONDENSERS

HEAVY CASTINGS

FLAKERS

HEAT EXCHANGERS

G-B, a leader in its field for over 50 years, offers complete responsibility . . . from design to finished product. Regardless of your processing problems, G-B has the practical experience, the engineering know-how and the manufacturing facilities to solve them. G-B Engineers are at your service at any time to discuss your processing problems . . . without cost or obligation.

Write for complete catalog showing the facilities and services of Goslin-Birmingham.



GOSLIN-BIRMINGHAM
MANUFACTURING CO., INC.
BIRMINGHAM • ALABAMA

When inquiring check 5336 opposite last page

CHEMICAL PROCESSING

a message for VIP's only



Every month thousands of Very Important Persons, like yourself, prove they are reading **CHEMICAL PROCESSING**.

How's that? Is this so much "loose talk"?

No . . . that statement is solidly based on an audit of *known* readers — an *actual* check of readers who, in search of specific information to meet their specific needs, used the Reader Service Slip opposite the last page of each issue.*

Suppose we let the facts speak for themselves. In one of our recent, smaller issues, a total of 12,757 product requests were made by 2430 different key industrial processing persons. These folks are employed by manufacturing companies using chemical processing techniques. More than 79% of them work for firms having a capital rating over \$1,000,000. The fact that these are *key* people is borne out by the following tabulation on that issue.

Titles	Percentage of requesting persons
Presidents, Vice Presidents, Other Corporate Officers, Owners, Partners, Executives	3.3%
Works Executives, Superintendents, Plant Managers, and Assistants	10.4
Supervisors, Department Heads, Foremen, and Assistants	12.7
Technical Directors, Directors of Research, Chief Chemists, Chief Metallurgists, and Assistants	12.7
Other Chemists, Metallurgists, Technologists, and Assistants	11.9
Engineers: Chief, Chemical, Process, Plant, Production, and Assistants	48.0
Technical Purchasing Agents	1.0
TOTAL REQUESTS FROM INDUSTRIAL PROCESSING PEOPLE	100.0

Over 1500 additional requests came from 248 Independent Consultants, Government people, Librarians, and those not giving titles: A grand total of 2678 persons known to read the issue. Naturally we are proud of this evidence of high readership and use of CP, for our job is

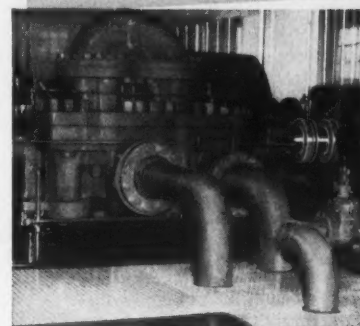
to serve you key folks by giving you, month after month, information that you will read and profit by.

Can we serve you better? We welcome your suggestions and comments.

THE EDITORS
OF **CHEMICAL PROCESSING**

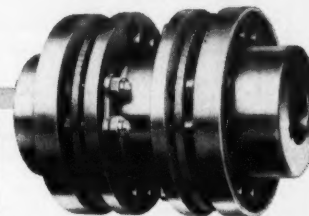
*Of course, this audit of known readership does not include readers who correspond directly with our editors or manufacturers of the equipment or material discussed. Nor does it include the thousands who read but do not act.

THOMAS FLEXIBLE COUPLINGS PROTECT Your Pumps



Pump troubles such as replacement of packing glands and bearings are practically eliminated when Thomas Flexible Couplings are used.

There is a **THOMAS** Coupling for every purpose.



**UNDER LOAD and MISALIGNMENT
ONLY THOMAS FLEXIBLE COUPLINGS
OFFER ALL THESE ADVANTAGES.**

- 1 No Cross-pull on Bearings or Gland.
- 2 No End-thrust on Bearings or Impeller.
- 3 Freedom from Backlash — Torsional Rigidity.
- 4 Free End Float.
- 5 Smooth Continuous Drive with Constant Rotational Velocity.
- 6 Visual Inspection in Operation.
- 7 Original Balance for Life.
- 8 No Lubrication.
- 9 No Wearing Parts.
- 10 No Maintenance.

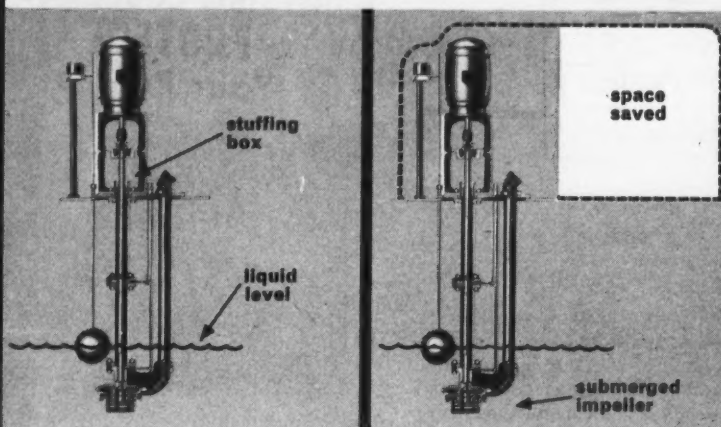
Write for Engineering Catalog 51-A

**THOMAS FLEXIBLE
COUPLING CO.**

WARREN, PENNSYLVANIA, U. S. A.

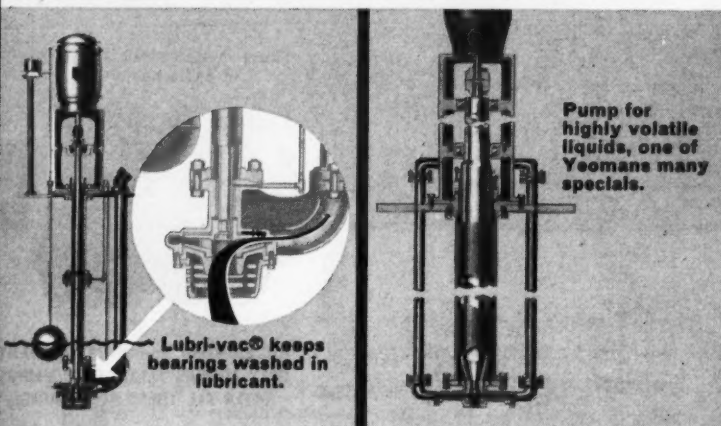
When inquiring check 5337
opposite last page

**you stop leakage, save space, and cut costs with Yeomans
VERTICAL WET PIT PUMPS**



ELIMINATE LEAKAGE. Stuffing boxes and seals are not under liquid pressure. With the Yeomans Vertical Wet Pit Pump there are no costly, annoying, or dangerous liquid leaks, as with horizontal pumps.

SAVE FLOOR SPACE. They use less than half the space required by horizontal pumps. Also, no priming equipment is needed as with suction lift horizontals. Impellers are submerged in the liquid ready for service.



CUT MAINTENANCE COSTS. With exclusive Lubri-vac® bearings are kept free of abrasive matter. Lubricant pressure prevents fluids from working into bearings. Result: Bearing failures are 90% less than with conventional vertical wet pit pumps.

SPECIAL DESIGNS. 59 Years of experience has enabled Yeomans to develop many excellent special designs for pumping "problem materials." All pumps can be furnished with ferrous and nonferrous alloy parts as required. Capacity range from 5 to 10,000 g.p.m.



YEOMANS

Manufacturers of: pumps for drainage • sewage • condensation return • water supply and circulation • equipment for treatment of domestic and industrial wastes.

Yeomans, 2003-5 N. Ruby Street, Melrose Park, Illinois

Please send me the catalog on Yeomans Heavy-Duty Vertical Wet Pit Pumps for...

☐ solids-free liquids

☐ solids-bearing liquids

name _____
company _____
street _____
city _____ zone _____ state _____

When inquiring check 5338 opposite last page

cp

NEW LITERATURE

Industrial bulletins pertinent to the reader . . . offering data on products, processes, services. Additional reviews of catalogs, bulletins, data sheets, etc., are found throughout other sections of this magazine

See, hear, actual dispute

Description of documentary film presenting on-the-spot, unrehearsed view of actual labor-management arbitration hearing is presented in six-page folder. Explanation of how to obtain the film is included. Arbitration film brochure — American Management Association, Dept. CP, 1515 Broadway, Times Square, New York 36, N.Y. Check 5339.

Cuts dehydrating costs

Bulletin of four pages tells how manufacturer's caustic dehydrating system cuts installation and operational costs to less than half of a conventional system. Bul SW-203 — Swenson Evaporator Co., Div. of Whiting Corp., Dept. CP, Harvey, Ill. Check 5340.

Torque-converter drive

Pair of two-page specification sheets describe advantage of torque-converter drive for manufacturer's lift trucks. Forms 1330-C and 1481 — Hyster Co., Dept. CP, 2902 N.E. Clackamas St., Portland 8, Ore. Check 5341.

Air-control valve data

Information file of 71 pages on manufacturer's series of air-control valves includes dimensional data, parts list, descriptive information, price list, and flow diagrams. "Star-line" folder — Ross Operating Valve Co., Dept. CP, 120 East Golden Gate Ave., Detroit 3, Mich. Check 5342.

Lists zirconium properties

Physical properties of zirconium and alloys and mechanical properties of three different tempers of these metals are contained in 10-page special analysis memo.

Information on fabrication, machining, and grinding is included. Corrosion resistance to various liquids and gases is discussed. Special Analysis Memo 112 — Superior Tube Co., Dept. CP, 1512 Germantown Ave., Norristown, Pa. Check 5343.

Radiation shielding

Design, properties, and dimensions of zinc bromide windows for radiation shielding are presented in four-page bulletin. Features are pointed out. Drawings show construction. "Radiation Shielding Windows" — Marfre Mfg. Co., Dept. CP, 156 W. Washington St., West Chicago, Ill. Check 5344.

Plate magnets

Manufacturer's line of plate separators in sizes and strengths for every conceivable application are shown in four-page illustrated bulletin. Bul B-10-1 — Eriez Mfg. Co., Dept. CP, Erie 6, Pa. Check 5345.

Spectrochemical analysis

Bulletin of 28 pages describes the basic fundamentals of spectrochemical analysis. Bul CH401 — Jarrell-Ash Company, Dept. CP, 26 Farwell St., Newtonville 60, Mass. Check 5346.

Coatings

Manufacture 72 pages on function coatings for space. For Laboratory 11, N.

Technical on tank

Technical discusses able for service, design, s tenance on Tank tive Coat Inc., Dep Abbottsfo phia 29, N

Pyromet

Description application potentiometer indicator page bulletin 64 Co., Inc. Brook, N

Mixing,

Capacities stainless storage two o-pag models features lined st corrosive in compa tin. Bul and Bu Steel) Dept. C Rochester

Posters on hand

Two 77 in black rules for handling ers — Departm cose C 1617 Pe adelphia

AUGU

Coatings handbook

Manufacturer's handbook of 72 pages contains information on function and use of various coatings for corrosion resistance. Form 990 — Truscon Laboratories, Dept. CP, Detroit 11, Mich. Check 5347.

Technical paper on tank linings

Technical paper of 20 pages discusses tank linings available for severe immersion service, along with economic, design, selection, and maintenance factors. Tech Paper on Tank Linings — Protective Coatings Div., Metalweld, Inc., Dept. CP, Scotts Lane & Abbottsford Ave., Philadelphia 29, Pa. Check 5348.

Pyrometer lowdown

Description, specifications, and applications of null-balance potentiometer-type pyrometer indicator are detailed in four-page bulletin. Instrument Section 64 — Thermo Electric Co., Inc., Dept. CP, Saddle Brook, N. J. Check 5349.

Mixing, storage tanks

Capacities and dimensions of stainless steel mixing and storage tanks are listed in two-page bulletin. Various models are illustrated and features pointed out. Glass-lined steel tanks for storing corrosive acids are discussed in companion two-page bulletin. Bul 941 (Stainless Steel) and Bul 918 (Glass-lined Steel) — The Pfauddler Co., Dept. CP, 1031 West Ave., Rochester, N.Y. Check 5350.

Posters give instructions on handling cellophane

Two 77 by 22" posters, printed in black and green, present rules for proper storage and handling of cellophane. Posters — Market Development Department, American Viscose Corporation, Dept. CP, 1617 Pennsylvania Blvd., Philadelphia 3, Pa. Check 5351.

Catalytic feed recovery

How "paracritical" liquid-liquid extraction process recovers 40 to 75% of profitable catalytic feed from refinery residues which would otherwise go to fuel or thermal cracking is described in 16-page bulletin. "Kelloggram" 3 — The M. W. Kellogg Co., Dept. CP, 711 Third Ave., New York 17, New York. Check 5352.

Separator data

Catalog of 22 pages describes vibrating screen separator for removing solids from liquids and screening all types of dry materials. Dimensions and specifications are listed. Bul S-56-1 — Separator Div., Southwestern Engineering Co., Dept. CP, 4800 Santa Fe Ave., Los Angeles 58, Calif. Check 5353.

Nylon insulated unions

Features, construction, specifications, and prices of nylon insulated unions and nylon sleeves and washers are listed on two-page data sheets. Data sheets on insulated unions, and nylon sleeves and washers — Central Plastics Co., Dept. CP, PO Box 762, Shawnee, Okla. Check 5354.

Water-bath controllers

Data sheet of two pages describes self-contained unit for laboratory water baths that combines heater, stirrer, and circulator with built-in pneumatic control system and temperature indicator. Water-bath controller bul — Arthur S. LaPine & Company, Dept. CP, 6001 S. Knox Ave., Chicago 29, Ill. Check 5355.

Instrument accessories

Bulletin of four pages describes accessories for various types of gages, dial thermometers, and recorders. Cat 600 — U. S. Gauge Division, American Machine and Metals, Inc., Dept. CP, Sellersville, Pa. Check 5356.



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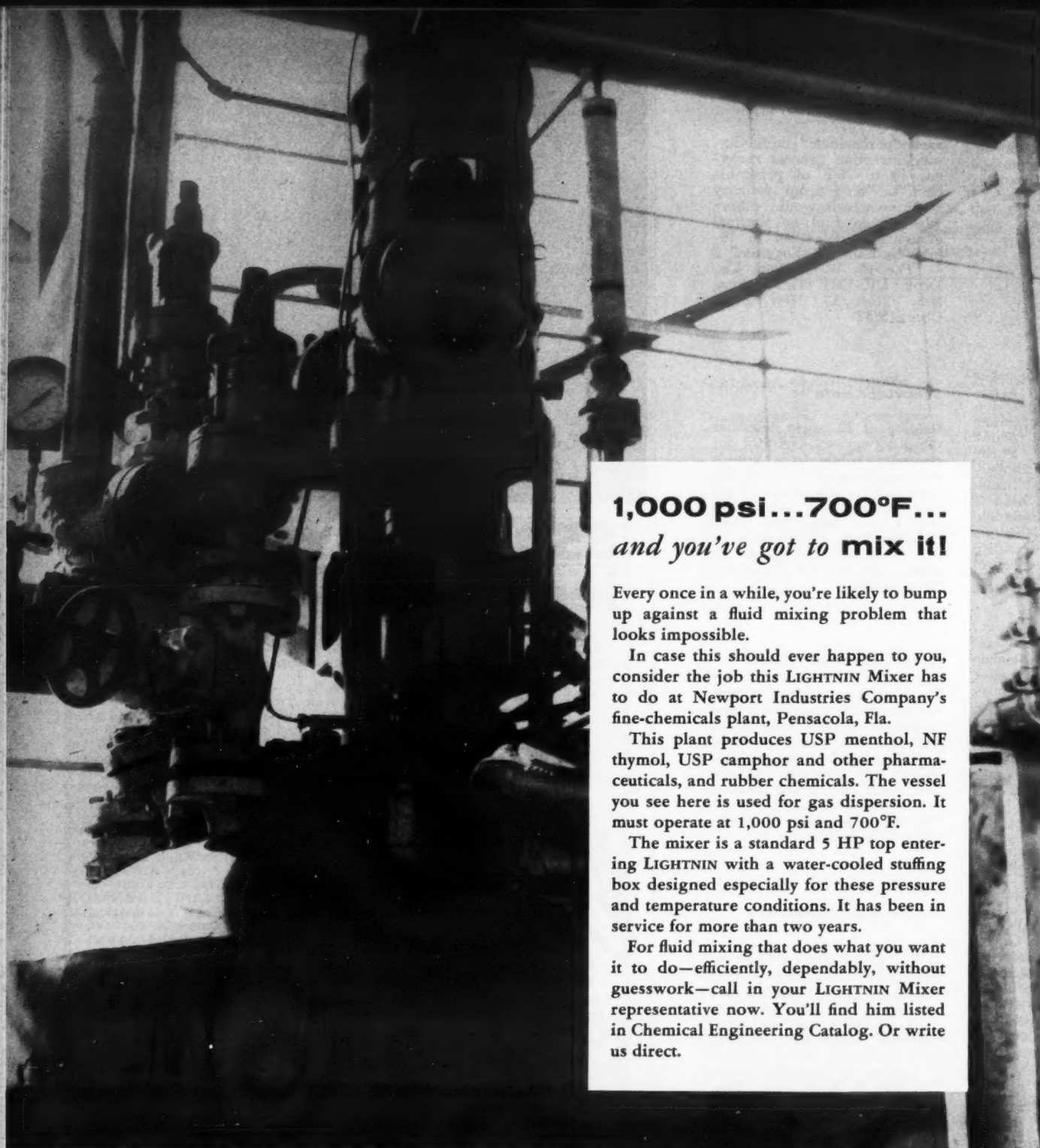
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When inquiring check 5357 opposite last page



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Check, clip, and mail with your name, title, company address to:

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In Canada: Greey Mixing Equipment, Ltd., 100 Miranda Avenue, Toronto 10, Ont.

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MIXCO fluid mixing specialists

For more information on product at left, specify 5358 see information request blank opposite last page.



Data on

Rigid hashers, various are described in log. Cat. Mfg. Co., Check 53

Increase

Bulletin describes dumping how how be increased — Koeh Milwaukee 5360.

Drafting

Covering plies, four check list cut down rate time reduce f Check l Company North A 18, Ill. C

Lists ov

Well-known ic chem page cat Matheson so lists organics and inc purity a ment a — Chi Dept. Ave., C 5362.

GAS CH AND T

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NEW LITERATURE

Data on crushers

Rigid hammer-type grinders, hashers, and shredders for various processing operations are described in 16-page catalog, Cat 907 — The Jeffrey Mfg. Co., Columbus 16, Ohio. Check 5359.

Increased haul output

Bulletin of 24 pages, which describes manufacturer's dumping equipment, shows how hourly haul output can be increased. "Dumpton" Bul — Koehring Co., Dept. CP, Milwaukee 16, Wis. Check 5360.

Drafting room check list

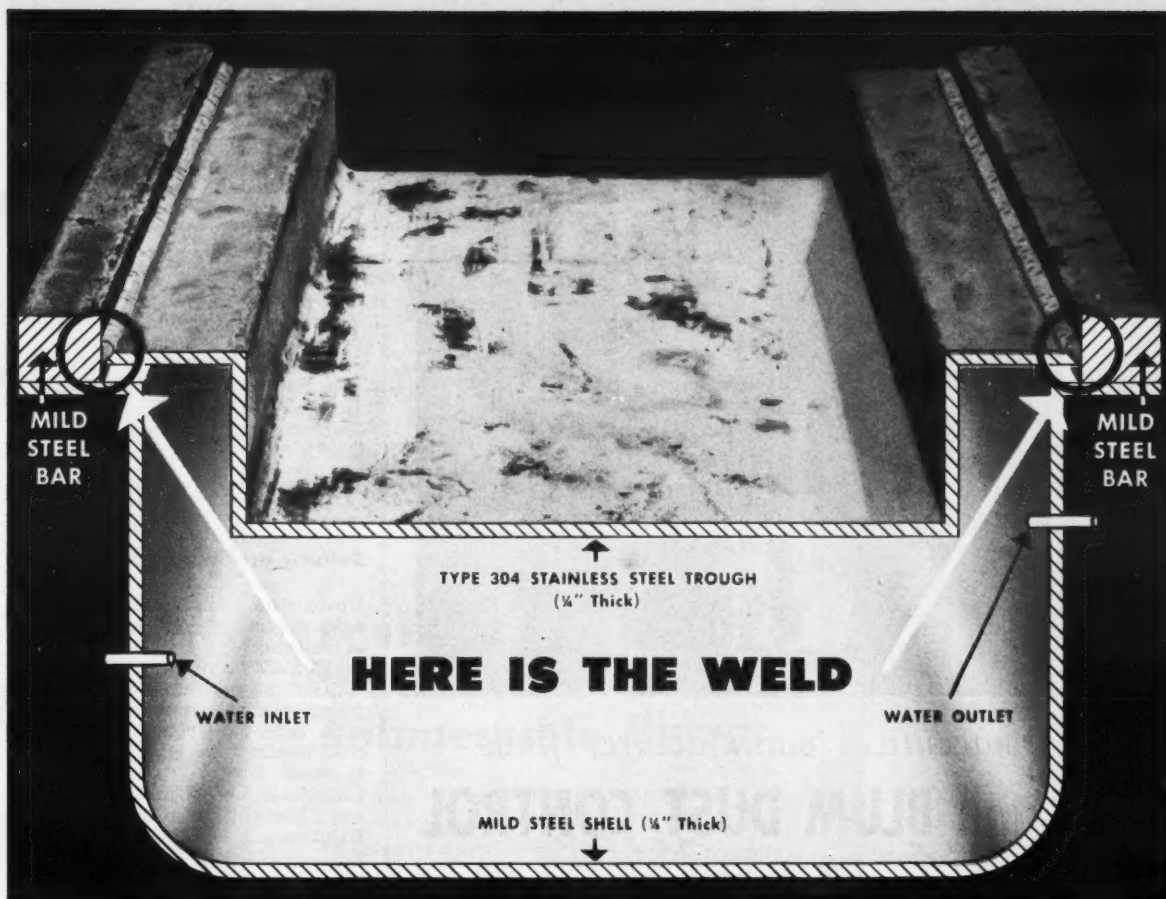
Covering equipment and supplies, four-page drafting-room check list suggests ways to cut down waste motion, eliminate time-consuming methods, reduce fatigue, and save space. Check list — Frederick Post Company, Dept. CP, 3650 North Avondale Ave., Chicago 18, Ill. Check 5361.

Lists over 2500 organics

Well-known and rare organic chemicals are listed in 80-page catalog. Listing over 2500 Matheson organics, catalog also lists group of reagent inorganics and biological stains and indicators. Standards of purity and methods of shipment are discussed. Cat 57C — Chicago Apparatus Co., Dept. CP, 1735 N. Ashland Ave., Chicago 22, Ill. Check 5362.

GAS CHROMATOGRAPHY AND THE AUTOMATED PLANT

How does modern process instrumentation fit into the concept of the automated plant? Twenty of the nation's top experts on instrumentation and data reduction met to discuss the problems of the automated plant. Read the exclusive panel report in September's Instrumentation feature.



No special equipment... No new training for the weldor

Inco-Rod "A" joins dissimilar alloys to fabricate chemical drag conveyor

Here's the way Inco-Rod "A"* electrode solves welding problems that often come up in the process industries.

The job was a drag conveyor trough at International Minerals and Chemical Corporation's Carlsbad plant. Made of 304 stainless steel, it carries magnesium oxide containing corrosive chlorides and sulfates coming from a rotary kiln at 1200°F.

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Dissimilar Alloy Welds A Maintenance Problem?

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INCO-ROD "A" electrode is supplied in four diameters: 3/32-, 1/8-, 5/32-, and 3/16-inch... packed in 5-lb. containers.



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Inco-Rod "A" electrode can be used in all positions... gives a spray-type arc and easy slag removal. And because this one electrode welds most dissimilar alloys found in processing plants, your welding rod inventory problems are simplified.

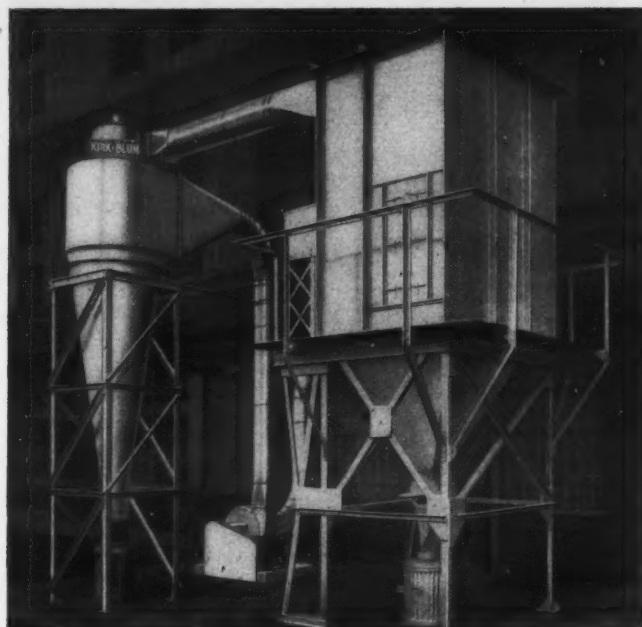
More facts and figures on using Inco-Rod "A" electrode in dissimilar alloy welding are given in Inco's new folder "Inco-Rod 'A' Electrode." For your copy, write:

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THE KIRK AND BLUM MANUFACTURING COMPANY
3133 FORRER STREET CINCINNATI 9, OHIO

When inquiring check 5364 opposite last page

NEW LITERATURE

Tape coatings catalog

Method of application of protective tape coating to pipe is explained in 25-page catalog. Case histories of applications, including preparation of surfaces, how they are coated, and inspection are cited. Diagrams, drawings illustrate advantages of wrapping with polyethylene tape. "Polyken" Protective Coatings — Polyken Sales Div., The Kendall Company, Dept. CP, 309 W. Jackson Blvd., Chicago 6, Ill. Check 5365.

Sulfuric acid wallchart

Up-to-date instructions for safe unloading and handling of sulfuric acid are presented in 17 x 22" wall chart. It describes proper methods for pump and air unloading of tank cars, with emphasis on cold weather procedure. Safety wall chart — Industrial Chemicals Div., Olin Mathieson Chemical Corp., Dept. CP, Baltimore 3, Md. Check 5366.

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Note the number in last line of each new literature review. Check this key number on Reader Service Slip opposite last page of this issue. Fill in the Slip with the other pertinent information (name, title, company, address, product made). Mail to our Reader Service Department.

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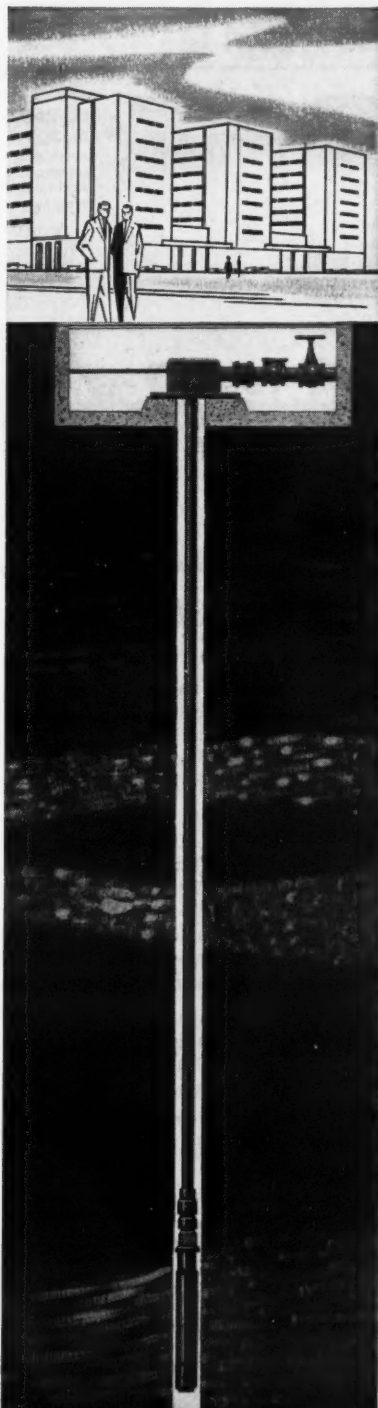
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WORTHINGTON

When inquiring check 5367
opposite last page

CHEMICAL PROCESSING

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For more information on product at right, specify 5368 see information request blank opposite last page.



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opposite last page

NEW LITERATURE

Urethane polymers folder

Combination catalog and file folder on urethane polymers, contained in 9 x 12 brochure, can be easily kept up to date. File section has eight pages of information on two-liquid component formulations. As additional data are released, they can be added to file. Booklet explains how custom formulations are created. Catalog-file — Dayton Rubber Co., Dept. CP, Dayton 1, Ohio. Check 5370.

Fertilizing forests

Practice of fertilizing forests to increase wood production is considerably more advanced in West Germany than in the United States. Report of 112 pages tells how increased nursery yields of 100 to 400%, and increased yields of forest trees by 150 to 250% were achieved through use of fertilizer and novel methods of application. To obtain "The Use of Commercial Fertilizers, Particularly Nitrogen, in Forestry" write direct to Dr. E. D. Crittenden, Nitrogen Div., Allied Chemical & Dye Corp., Dept. CP, 40 Rector St., New York 6, N. Y.

Pocket-size safety manual

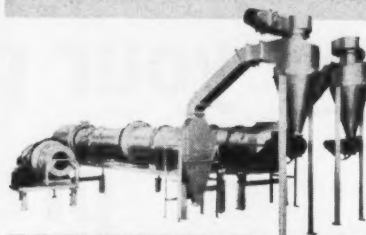
Compact, pocket-size, illustrated manual of 56 pages covers accident prevention, first aid, fire prevention, and safety equipment in laboratory. Sections on handling radioactive materials, and use of isolation units for hazardous microbiological and clinical procedures, as well as safety bibliography, are included. Bul FS 201 — Fisher Scientific Co., Dept. CP, Fisher Bldg., Rosion Keys for Aluminum—Pittsburgh 19, Pa. Check 5371.

Aluminum corrosion guide

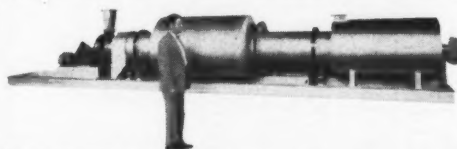
As an aid to engineers using aluminum in process plants or equipment, handy six-page guide tells at a glance the yearly corrosion rate of more than 100 chemicals and other materials on aluminum. "Corrosion Keys for Aluminum"—Reynolds Metals Co., Dept. CP, 2500 S. Third St., Louisville, Ky. Check 5372.

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CHEMICAL PROCESSING

NEW LITERATURE

Nickel-base alloy data

Up-to-date information on four nickel-base alloys is presented in 104-page booklet. Chemical compositions, and physical, mechanical, and high-temperature properties are described. Comparative resistance table to over 250 corrosives commonly handled in chemical, petroleum, paper, pulp, pharmaceutical, and metal-working industries is included. "Hastelloy Corrosion-Resistant Alloys" — Haynes Stellite Co., Div. of Union Carbide Corp., Dept. CP, 420 Lexington Ave., New York 17, N.Y. Check 5375.

Zirconium bibliography

Sources of information pertaining to applications and mechanical, physical, electrical, chemical, and nuclear properties of zirconium and its alloys are presented in seven-page bibliography. Tabulation is believed to contain all major books, pamphlets, and articles published since 1950. Zirconium Bibliography — Columbia-National Corporation, Dept. CP, 70 Memorial Dr., Cambridge 42, Mass. Check 5376.

Automatic control features

Over 100 items are listed in 56-page catalog on automatic controls. Featuring hermetically-sealed mercury contacts, controls for pressure, temperature, liquid level, and mechanical movement are treated. Cat 857 — The Mercoid Corp., Dept. CP, 4201 Belmont Ave., Chicago 41, Ill. Check 5377.

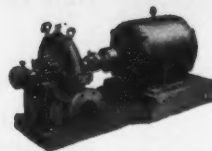
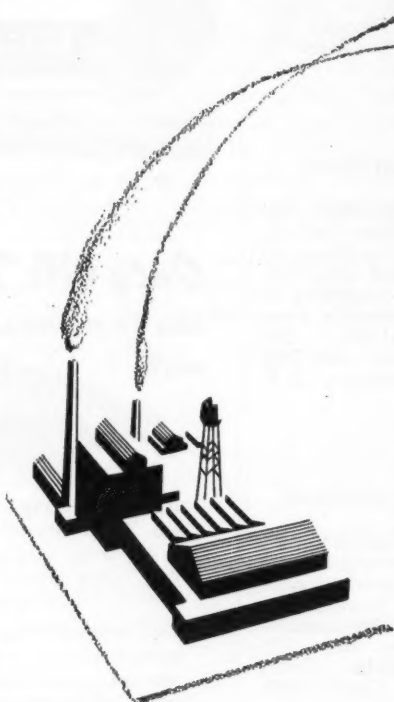


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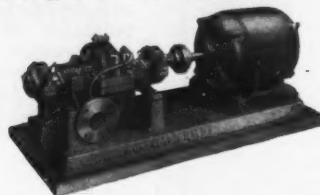
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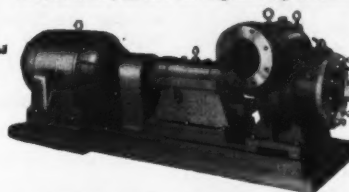
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CLEAR WATER — For clear water service there is no more efficient pump than the double-suction "Buffalo" Type "SL". Its hydraulic balance, its free-flow water passages and husky construction mean economical service over many years. Capacities from 10 to 14,000 gpm. Write for Bulletin 955.



HIGH PRESSURE — "Buffalo" Type "RR" Multi-stage Pumps combine rugged strength and efficiency on boiler feed and other clear water service, against heads as high as 1500 feet, in capacities up to 900 gpm. Shafts are extra-heavy with ball bearing support on both ends — stuffing boxes are deep. Write for Bulletin 980 for all engineering details.



NON-CLOGGING — For moving high-consistency liquids, "Buffalo" Diagonally Split-Shell Pumps offer freedom from expensive shutdowns. And since efficiency does not depend on close impeller clearances, there is no problem of "wedging" and wear. Available rubber-lined for corrosive or abrasive liquids. Write for Bulletin 953.



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CHEMICAL LIQUIDS — "Buffalo" builds 10 special types of chemical pumps in a wide choice of trim for almost any corrosive, abrasive or high-consistency liquid. Above is a single-suction, full ball bearing model. Write for Bulletin 982 and check this wide selection.

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When inquiring check 5378 opposite last page

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NEW LITERATURE

Acrylonitrile polymers

Preferred lab techniques for polymerizing and copolymerizing acrylonitrile are presented in detail in 76-page bulletin. Monomer reactivity ratios and their utilization in designing experimental procedures are discussed. Bul on polymers and copolymers of acrylonitrile — Petrochemicals Dept., American Cyanamid Co., Dept. CP, 30 Rockefeller Plaza, New York 20, N. Y. Check 5379.

Data on check valves

Design, operating, application, and specification data on check valves for vapor, liquid, or gas are listed in four-page bulletin. Bul 16 — Sealol Corp., Dept. CP, Warwick Industrial Park, Providence 5, R.I. Check 5380.

Glassed-steel autoclave

Glassed-steel laboratory and pilot plant autoclave for use in conducting reactions at high pressures and under severe corrosion conditions is shown and discussed in two-page bulletin. Bul 939 — The Pfaudler Co., Dept. CP, 1029 West Ave., Rochester, N.Y. Check 5381.

Gravity, power conveyor

Applications of manufacturer's gravity and power-belt conveyors are illustrated in various installation photographs. Form IND-1 — The Rapids-Standard Co., Inc., Dept. CP, 342 Rapistan Bldg., Grand Rapids 2, Mich. Check 5382.

Stainless steel tube

Manufacturer's stainless steel and high-alloy pipe and tube ranging from 1/8" to 40" in outside diameter are described in 48-page catalog. Special section on titanium tube outlines advantages. "Contour Trentweld" — Trent Tube Co., Subsidiary of Crucible Steel Company of America, Dept. CP, East Troy, Wis. Check 5383.

When it's B/M "Matched Metering"

—you know
it's accurate!

The high fidelity of Burgess-Manning Electric and Electronic Meters is made possible only by the Burgess-Manning null-balance inductance bridge, servo-powered meter principle employed. To this has been added the refinement of a calibrated cam, which matches the calibration of the recorder-totalizer and the differential producer for perfection thru "Matched Metering." Burgess-Manning electric transmission is suitable for distances up to 5000 feet. You'll never regret having specified Burgess-Manning "Matched Metering" for greatest overall accuracy.

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PENN INSTRUMENTS DIVISION

4126 Haverford Ave., Philadelphia 4, Pennsylvania

Instrumentation and Controls
for water, steam, gases, sewage and industrial wastes

When inquiring check 5384 opposite last page

Only ONE Torque Wrench
can be accurately used
with . . .

**EXTENSIONS and
ADAPTERS**

It is mechanically impossible to use any Torque Wrench with adapters or extensions (with accuracy) unless that Torque Wrench has a positive, built-in, fixed load position.

This essential factor of accuracy, misunderstood or ignored in the design and manufacture of some torque tools, can completely defeat their purpose.

**PATENTED
PIVOTED HANDLE
FIXES LOAD POSITION**



Write for Torque Manual

with formulae tables and explanations for correct use of adapters and extensions.

PA STURTEVANT CO
ADDITION QUALITY ILLINOIS

When inquiring check 5385 opposite last page

CHEMICAL PROCESSING

Describes insulation

Specifications for manufacturer's line of spun mineral wool industrial insulating products are included in 20-page catalog. "Industrial Insulations" — Baldwin-Hill Co., Dept. CP, 500 Breunig Ave., Trenton 2, N.J. Check 5386.

Precipitator automation

System which brings complete automation to power inputs of electro-static precipitators, eliminating manual adjustments and increasing round-the-clock dust and fume collection efficiencies, is described in eight-page bulletin. Automation system bul — Research-Cottrell, Inc., Dept. CP, Bound Brook, N.J. Check 5387.

Trailer for bulk transport

Bulletin of four pages describes and illustrates trailer designed for bulk transportation of pulverized and granular materials. Illustrations show how trailer can be loaded from overhead bins or from bulk railroad car at team track. Bul A-19 — Fuller Co., Dept. CP, Catasauqua, Pa. Check 5388.

LVDT information

Questions on techniques involved in use of linear variable differential transformers (LVDT's) for accurate determination and control of mechanical quantities are answered in detail in 24-page bulletin. Bul AA-1A — Schaevitz Engineering, Dept. CP, PO Box 505, Camden, 1 N. J. Check 5389.

Marking cylindrical parts

Marking machine that provides high-speed marking on variety of cylindrical or cone-shaped parts at rates of 6000 to 7000 per hr is described and illustrated in four-page bulletin. Bul 146-C9 — Jas. H. Matthews & Co., Dept. CP, 3942 Forbes St., Pittsburgh 13, Pa. Check 5390.

Pumps viscous liquids and semisolids without churning or chopping

New, air-operated *Ejectopump* works with a powerful yet gentle action. Whole grapes or even live goldfish can be pumped without crushing. "Handle with care" viscous materials such as latex are pumped without shear or turbulence. Because there's no churning or whirling action, *Ejectopump* is also ideally suited for pumping pottery slip, gritty slumps and other highly abrasive liquids.

Ejectopump needs practically no maintenance. Has no rotating or reciprocating parts, no bearings, no packing. Needs no lubrication. Quickly disassembled for cleaning.

Operation

Connect to any compressed air line 30 to 50 psi. Handles discharge heads up to 100 ft., with maximum suction 20 ft. Discharge rate may be precisely regulated. Pump is self-priming, may be installed above level of liquid pumped. Can be furnished in special alloys for pumping corrosives. Sizes: 1½", 2", 3", 4", 6".

WRITE TODAY for complete information and prices



FERRO CORPORATION
Supplies Division

4150 East 56th Street, Cleveland 5, Ohio



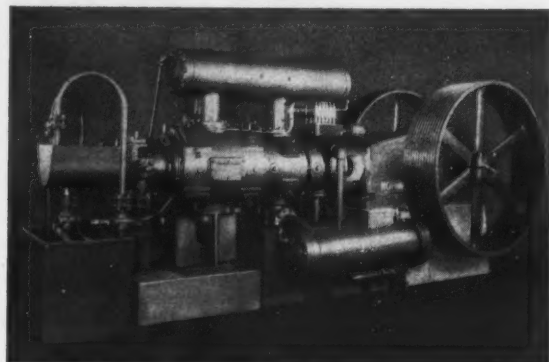
Ejectopump

COMPRESSED AIR OPERATED

When inquiring check 5391 opposite last page

NORWALK

HIGH PRESSURE COMPRESSOR



The five stages on this heavy-duty tandem compressor require less horsepower and develop less heat than in four stages in producing 3000 lb. per square inch pressure in capacities up to 31,000 cfh.

Frames with double row roller bearings, reversible ring plate valves, force feed lubrication, generous intercooler coils are some of the features that make this horizontal compressor compact, sturdy and efficient to operate and maintain.

Every Norwalk compressor is test-run for eight hours at the factory, then taken down for complete inspection before re-assembly and shipment.

Norwalk makes compressors from single stage to six stages, from 125 to 25,000 lb. psi. Catalog on request.



NORWALK COMPANY, INC.
SOUTH NORWALK, CONNECTICUT

Established 1864

When inquiring check 5392 opposite last page

NEW LITERATURE

Low nickel alloy

Two technical data sheets of three and four pages provide information on low nickel alloy which may be substituted for higher nickel alloys in many industrial applications. Comparable corrosion-resistance qualities are pointed out. ASL 285, 286 — Tubular Products Div., The Babcock & Wilcox Co., Dept. CP, Beaver Falls, Pa. Check 5393.

Rotary feeder features

Bulletin of six pages describes construction features of rotary feeder for heavy duty material handling applications. Data Sheet DVC—Allen-Sherman-Hoff Co., Dept. CP, 259 E. Lancaster Ave., Wynnewood, Pa. Check 5394.

Cooling tower controls

System for automatically controlling make-up water flow, chemical feed, and blowdown rate of cooling towers is discussed in four-page bulletin. Bul 1050 — Bailey Meter Company, Dept. CP, 1050 Ivanhoe Rd., Cleveland 10, Ohio. Check 5395.

Low-temperature cabinets

Manufacturer's models of sub-zero laboratory freezers are illustrated in four-page bulletin. Bul 2-57 — Webber Corporation, Dept. CP, PO Box 217, Indianapolis 6, Ind. Check 5396.

Wanna Make Nomographs?

This month Dr. Davis begins his series of enlightening articles delving into the mysteries of making nomographs. Be sure to catch the first installment now appearing in the Processing and Engineering Data section, beginning on page 71.

Get This New STRAUB Catalog



Fully describes the complete line of STRAUB gas generators.

Efficient, compact STRAUB Gas Generators are available in three basic types — endothermic, exothermic and nitrogen. A wide variety of styles and sizes meet every need. If you have a gas blanketing or controlled atmosphere problem write for this helpful catalog.



A. A. STRAUB COMPANY, INC.

4936 Grayton Road, Cleveland 11, Ohio

When inquiring check 5397 opposite last page



Drive out
FOUL AIR
Blow in
FRESH AIR
with Coppus Type A Ventilator

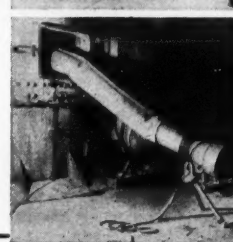
Assure greater safety, comfort for workers . . . get greater efficiency.

Drive out dangerous fumes, gases, stagnant or hot air from boilers, cable manholes, tanks, vats and other confined places. **Supply fresh air continuously.**

Send now for further information. Coppus Engineering Corporation, 388 Park Avenue, Worcester 2, Mass.

♦ **MANHOLES** made safe for workers' entrance within minutes.

♦ **BOILER AND TANK INTERIORS** cooled by Coppus. Fresh air supplied continuously.



When inquiring check 5398 opposite last page

CHEMICAL PROCESSING



Center-guided
type for lines
from 1' to 10'.

Globe-type
for lines
from 3' to 24'.

WILLIAMS-HAGER
FLANGED
Silent
CHECK VALVES

Surge pressures... and the resulting water hammer... are effectively controlled by these valves. Protection for pumps and piping systems is assured—a fact testified to by satisfactory service in every type of industry over a period of 28 years, in pressures up to 5,000 pounds.



Write for Bulletins:
No. 654 on the Valves
No. 851 on Cause, Effect
and Control of Water
Hammer

THE WILLIAMS GAUGE CO., INC.
146 Stanwix Street
2 Gateway Center Pittsburgh 22, Pa.
Our 71st Year • 1886-1957

When inquiring check 5399
opposite last page

NEW LITERATURE

Catalog features belts for hot materials

Complete line of belts for hot materials with temperatures up to 350°F is presented in 22-page catalog. Grain belts for oily and non-oily whole or cracked grains are included. Cat 25 CB — Manhattan Rubber Division, Raybestos-Manhattan, Inc., Dept. CP, Passaic, New Jersey. Check 5400.

Trolley moves 3 tons

Designed as individual power unit for moving almost any type of equipment on an overhead track, motor-driven "tractor" trolley is described in four-page bulletin. Bul 1507 — The Yale & Towne Mfg. Co., Dept. CP, 11,000 Roosevelt Blvd., Philadelphia 15, Pa. Check 5401.

Elevated water tanks

Two types of water-storage tanks ranging in capacity from 25,000 through 500,000 gallons are described in 16-page brochure. "Modern Elevated Water Tanks" — Chicago Bridge & Iron Company, Dept. CP, 332 South Michigan, Chicago 4, Ill. Check 5402.

Granular material dryers

Dimensions and specifications for dual-flow rotary dryers capable of evaporating up to 400 lb of water per hr are listed in two-page bulletin. Bul RDB-101 — Carpc Co. Mfg. Inc., Dept. CP, PO Box 3272, Jacksonville 6, Fla. Check 5403.

Demineralizer cost data

Reprint of eight pages discusses role that demineralizer subfill plays in reducing costs of operation of demineralizing system. Laboratory investigations and field results are discussed in detail. Tech reprint T-153 — Graver Water Conditioning Co., Dept. CP, 216 West 14th Street, New York 11, N.Y. Check 5404.

HOW! PUMP USERS—



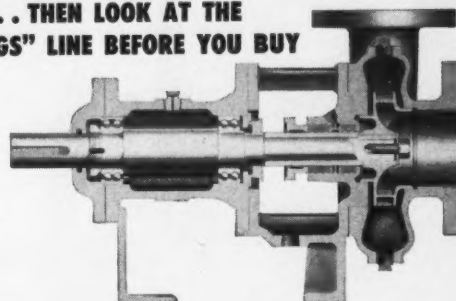
**BASE MOUNTED OR
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Pick your Pump to fit your needs

Choose from Dean Brothers companion lines of standard commercial centrifugal pumps—base mounted or close coupled.

When yours is a
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such as...

- Heat Transfer
- Reflux
- Vacuum
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... THEN LOOK AT THE
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Type "GS"—for General and Chemical Services

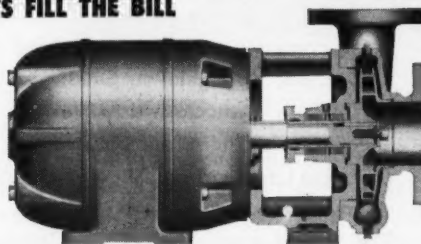
- 7 INTERCHANGEABLE SIZES—up to 600 gal. per min.
- TOTAL DYNAMIC HEAD—up to 275 ft.
- Available from stock in ALL IRON, BRONZE FITTED or STAINLESS STEEL Construction.

For complete information, send for Circular No. 190.

For industrial
services
such as...

- Wash Water
- Product Cooling
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... DEAN BROTHERS "GSC" CLOSE COUPLED
UNITS FILL THE BILL



Type "GSC"—for General Service

- 7 SIZES—up to 600 gal. per min.
- TOTAL DYNAMIC HEAD—up to 275 ft.
- Available in ALL IRON, BRONZE FITTED or ALL BRONZE Construction.

Available with either Foot Mounted Motor Frame, as shown, and with Round Motor Frame.

For complete information, send for Circular No. 191.

The Best is our Standard

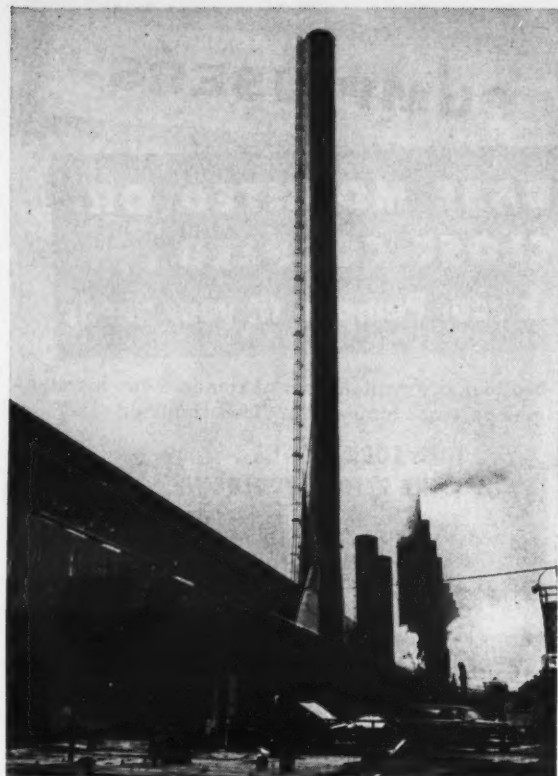
Consult the Yellow Pages of your phone book, under PUMPS,
for the local Dean Brothers sales engineer.



DEAN BROTHERS PUMPS INC.
EST. 1869

323 West 10th St., Indianapolis 7, Ind.

When inquiring check 5405 opposite last page



11' 1" diameter x 250' 0" high, butt welded, self-supporting steel open hearth stack for a leading steel producer.

TALL Against the Sky...

... this stack was furnished and fabricated complete including breeching section, in our Youngstown, Ohio, plant. It was shipped knocked down to the job site via rail. There, our construction department took over and erected the stack as shown in record time.

The Youngstown Steel Tank Company maintains a complete stack service including design, fabrication, construction, inspection and repair. We specialize in the steel producing and petro-chemical processing industries.



**The YOUNGSTOWN
STEEL TANK
COMPANY**
Youngstown, Ohio

When inquiring check 5406 opposite last page

NEW LITERATURE

Corrosion-resistant pump selector manual

Manual of 20 pages presents comparative data on four types of corrosion-resistant pumps for any application up to 350 gpm. Nearly 200 chemicals are listed, along with recommendations on most suitable pump to use. Bul CE-55 — American Hard Rubber Company, Dept. CP, 93 Worth St., New York 13, New York. Check 5407.

High-density felts

Characteristics, chemical properties, and physical properties of high-density felts are described in four-page data sheet. Samples of felts are included. Tech Data Sheet 19 — American Felt Co., Dept. CP, Glenville, Connecticut. Check 5408.

Stainless steel valves for atom power plant

Design, construction, and testing of large stainless steel coolant check valves for full scale nuclear power plant are discussed in 12-page bulletin. "Valve Values" Vol. 16, No. 45 — Edward Valves, Inc., Dept. CP, 1201 W. 145th Street, East Chicago, Ind. Check 5409.

Fork truck data

Specifications, dimensions, and operating and maintenance features of 4000 lb-capacity fork truck are contained in 6-page bulletin. "Clark-lift-40" Bul — Industrial Truck Div., Clark Equipment Company, Dept. CP, Battle Creek, Mich. Check 5410.

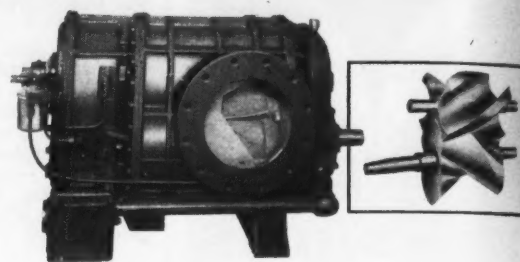
What's all this about
"Executive Size" ...?

Turn to page 94



AXI-COMPRESSORS

formerly "Standardaire"



AIR, GAS OR VAPOR PROBLEMS?

If you are interested in compressor efficiency for handling air, gas or vapor, investigate the I-R AXI-COMPRESSOR line. With unique axial-flow cycloidal design, the rotors never touch ... need no internal lubrication ... deliver oil-free air. More air with less power consumption. Sizes range from 100 cfm to 15,000 cfm, for vacuums to 25 inches, pressures to 15 psi. Details in Bulletin 11,001.

Ingersoll-Rand

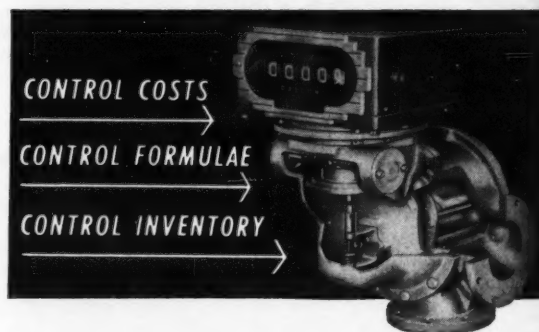
17-662

11 Broadway, New York 4, N. Y.

Over 1000 types and sizes of I-R compressors ... 1/4 to 6000 hp.

When inquiring check 5411 opposite last page

Stop Liquid Processing Waste



CONTROL COSTS

CONTROL FORMULAE

CONTROL INVENTORY

METER YOUR LIQUIDS AND SAVE!

Want accurate cost controls over liquids used in your plants? Need quality control for your formulations? Are your liquid inventories a problem? Then turn to Rockwell Industrial Meters. Get accurate metered records, quick! Made in a wide variety of sizes, types and materials, including all-stainless steel meters for corrosive services; automatic shut-off models for batching; remote registration for centralized control. Write for bulletin. Rockwell Manufacturing Company, Pittsburgh 8, Pa. Dept. 106H

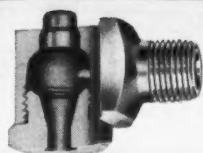
ROCKWELL INDUSTRIAL METERS

When inquiring check 5412 opposite last page

CHEMICAL PROCESSING

weeks of wear in minutes!

for better
SPRAY NOZZLE
RESISTANCE
to
abrasive liquids



• In the Spraying Systems research laboratory, new internal contour structures and new materials are measured for relative resistance to abrasion by means of the accelerated wear test. From research like this is developed the design data for spray nozzles with greatly improved performance and longer life. For complete information write for our Catalog No. 24.



SPRAYING SYSTEMS CO.
3216 RANDOLPH STREET • BELLWOOD, ILLINOIS
ADVANCED SPRAY NOZZLE DESIGN FOR NEW
DIMENSIONS IN CONTROL AND PERFORMANCE.

When inquiring check 5413 opposite last page

Darcova Pumcup

Darcova 45°
Bevel Type Pumcup



**Put Pumcups in your cylinders
TO HOLD PRESSURE LONGER!**

In Darcova Pumcups a sound engineering principle has been combined with precision tolerances and extremely durable compositions to provide exceptional efficiency and life in hydraulic, air, and reciprocating pump cylinders of all kinds.

Unlike ordinary piston packing, precision Pumcups are engineered to minimize friction load while hugging cylinder walls on every pressure stroke. Regardless of eventual wear, efficiency *stays* high! So there's far less down-time and need for replacement.

Pumcups are made in a wide range of sizes, types and texture-engineered compositions, including 100% Nylon, for all kinds of pressure-temperature-fluid conditions. Send for Pumcup Bulletin 5503 and weigh all the facts!

DARLING VALVE & MANUFACTURING CO.
Williamsport 4, Pa.



TRADE MARK
PUMCUPS

When inquiring check 5414 opposite last page

AUGUST 1957

NEW LITERATURE

Liquid-gas separation

Bulletin of ten pages covers liquid-gas separation device for removal of entrained liquids and solids from air, gas, and steam systems. Bul S-1052 — Selas Corp. of America, Dept. CP, Dresher, Pa. Check 5415.

Push-button stations

Features, dimension data, and application information on standard and heavy-duty push-button stations for motor starter control are contained in eight-page bulletin. GEA-6544 — General Electric Co., Dept. CP, Schenectady 5, N. Y. Check 5416.

Centrifugally cast tube

High temperature and physical properties, composition, and weight-per-inch of four most common grades of manufacturer's centrifugally cast tubes are listed in eight-page bulletin. Bul T-283 — Electro-Alloys Div., American Brake Shoe Co., Dept. CP, Elyria, Ohio. Check 5417.

Easy convertor selection

Full line of U-tube steam-to-water convertors is described in 12-page bulletin. Capacity tables are arranged to permit easy determination of size. A new step-by-step method has been devised to simplify convertor selection. Bul 50 — Davis Engineering Corp., Dept. CP, 1064 E. Grand Street, Elizabeth, N.J. Check 5418.

For steel users

Steel manufacturer's catalog of 232 pages lists 16 categories of special-purpose steels, including high-speed, tool, stainless, alloy, and machinery, available in 16,000 grades and sizes. Over 20 estimating, conversion, and weight tables, as well as other information useful to steel users, are included. Warehouse cat — Crucible Steel Co. of America, Pittsburgh 30, Pa. Check 5419.

**GARDEN CITY
FANS**

at JACKSON TILE
"have proven satisfactory"



JACKSON TILE Jackson, Mississippi, has one of the most modern plants in the world with a vast productive capacity

Garden City high-temperature fans, with a range of 400 to 1300 degrees Fahrenheit, are installed on the glaze and tunnel kilns of the famous Jackson Tile plant. Chosen because the patented air-cooled shaft prolongs the life of the bearings, helps keep production rolling without interruption. "Some of these fans have been operating for several years and have proven quite satisfactory", the plant engineer says. Why not find out how they can help you cut maintenance costs?

**TEAR OUT THIS AD . . . a reminder to write for
FREE CATALOG AND LIST OF "BLUE CHIP" USERS**

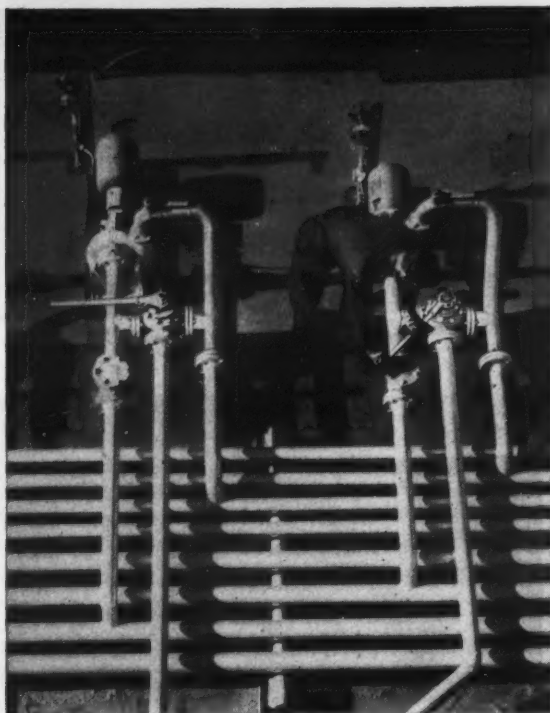
**GARDEN CITY
FAN COMPANY**
ESTABLISHED 1879

332 S. Michigan Ave.
Chicago 4, Illinois
Dept. P

Representatives
in Principal Cities

• Fans for Industry • Backward Curve • Forward Curve
• Material Handling • Radial Bladed • Small Exhaust

When inquiring check 5420 opposite last page



3-WAY FLOW CONTROL at the cost of only 1 valve!

One ROCKWELL-Nordstrom Multiport Valve Eliminates 3 or 4 Ordinary Valves

Imagine how complicated . . . and costly . . . the installation above would be if separate by-passes and valves were needed for each line. But with Rockwell-Nordstrom Multiport valves, these complex switching operations become simple, foolproof and economical. The drawings below (just three of many combinations), show why one Multiport can replace three or four ordinary valves.



In addition to original installation savings, Multiport valves *continue* to save you money because they're ruggedly built to stay efficient. *Pressurized lubricant* which forms a positive, leakproof seal, also prevents friction wear for longer life at lower cost.

Rockwell-Nordstrom Multiport valves (and the complete line of Straightway valves) are available in semi-steel, steel, stainless steel, bronze and other corrosion resisting metals. Write for complete details: Rockwell Manufacturing Company, Pittsburgh 8, Pa. *Canadian Valve Licensee: Peacock Brothers Limited.*



ROCKWELL-Nordstrom VALVES

LUBRICANT SEALED FOR POSITIVE SHUT-OFF

When inquiring check 5421 opposite last page

NEW LITERATURE

Air pollution research

Two reports of 85 and 70 pages, describing large-chamber experiments on auto exhausts, deal with eye irritation from irradiated auto exhausts, and reactions of auto exhausts in sunlight. To obtain Tech Report 18 (Eye Irritation From Irradiated Auto Exhaust) and Tech Report 19 (Reactions of Auto Exhaust in Sunlight) remit \$3.00, for each, direct to Air Pollution Foundation, Dept. CP, 704 S. Spring St., Los Angeles 14, Calif.

Corrosion protection of chemical plant

Four basic types of gilsonite-asphaltic mastic compounds are described in four-page folder which discusses corrosion protection of chemical plants, pulp mills and other industrial installations. "Chemical Plant and Pulp Mill Corrosion Protection" — Emjay Maintenance Engineers, Dept. CP, 327 Union Ave. Rutherford, N.J. Check 5422.

WANT MORE INFORMATION . . .

. . . about things you read about in the New Literature Section?

Here's How to Get It

Note the number in last line of each new literature review. Check this key number on Reader Service Slip opposite last page of this issue. Fill in the Slip with the other pertinent information (name, title, company, address, product made). Mail to our Reader Service Department.

We'll contact the manufacturer for you, telling him you'd like a copy of the bulletin. He'll send it direct to you.



What's a "New Solution"?

It's an article in
CHEMICAL PROCESSING
describing a new way of solving
a tough plant operating problem.

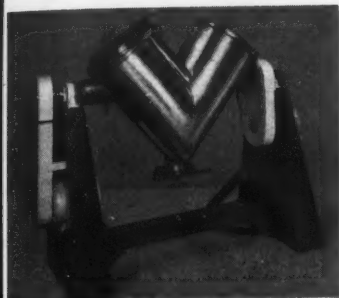
In each issue you will find
specific "case histories" showing
how these processing problems
were solved.

Each article states the
operating problem . . .
explains the process used
and gives details of how problem
was solved . . . shows results secured.

Take a look at "New Solutions"
articles in this issue—
they might suggest a "solution"
for some of your tough
processing problems.

This coupon
will bring you all
the facts on how...

you can blend
liquids-solids
in one fast step



P-K LIQUID-SOLIDS* BLENDER

- Intimately blends controlled amount of liquids of any viscosity
- Wire cage assembly prevents lumping
- Production models up to 50 cu. ft.
- Lab models available in 8 and 16 quart sizes, with transparent Lucite or stainless steel shells
- Three blenders in one—use as is for intensive blending; remove bar for plain blending
- Easy to charge, easy to empty, easy to clean
- Designed for pump or gravity feed

*Pat. Pending

The Patterson-Kelley Co., Inc.
128 Hanson St., E. Stroudsburg, Pa.

Yes! I want to find out everything about
the new p-k Liquid-Solids* blender. Send
me your new catalog 15-A plus a price list.

Name _____
Company _____
Address _____
City _____ State _____

Patterson-Kelley

When inquiring check 5423
opposite last page

Computers

Starts on page 27

ty, and bells and whistles, were not the need; a stripped-down printer, alone, was the machine required. Also, alphanumeric limitations were prevalent; accounting files use names and addresses, not only arithmetic.

Programming a variety of jobs, each offering only a modest savings return, could but result in extensive computer make-ready costs. Programming has other shortcomings such as...

inflexibility to changes necessitated by accounting procedure and policy revisions difficulty in debugging routines complexity to integrate related procedures independently.

In brief summary of medium-scale computer limitations, high costs associated with an installed system that can only be offset with mediocre results requires that all remaining controllable factors be resolutely pursued for maximum pay-out. The scientific computer should not be represented as an accounting data processing machine. Medium scale equipment (as well as large scale machines) are not readily adaptable to many problems of accounting. High rental (or purchase) prices, slowness in mass data filing, inaccessibility of interim data and ineffective input-output devices all tend to give "fast write off" to current equipment. Machine obsolescence is high, and with it goes proportionate expense in reprogramming time.

During the feasibility study commencing in July of 1955, Diamond's Systems and Procedures Staff analyzed equipment characteristics of the three major manufacturers of medium scale computers. Close comparisons were made on all features, speeds and peripheral units. Analysts attended programming schools on two makes.

Each manufacturer was invited and performed an analysis of a test area selected by

Turn to next page

DENVER PROCESS EQUIPMENT

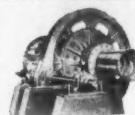
DENVER
(patented)
SUPER
AGITATORS
and **MIXERS**



SIZES
3'x 3'
to
20'x 20'

Patented standpipe around propeller shaft assures positive agitation and circulation. Patented wearing plate prevents sand-up on shut-down. Heavy duty as well as acid-proof construction is available in both open-type, air lift and Super Agitator models. Please write for Bulletin No. A2-B4.

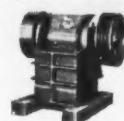
DENVER
Steel-Head
BALL MILL



3'x 2'
to
6'x 20'

A Denver Steel-Head Ball Mill will suit your particular need. Five types of discharge trunnions. All-steel construction. Low initial cost due to quantity production. Quick delivery. Laboratory and pilot plant mills also available. Please write for Bulletin No. B2-B13.

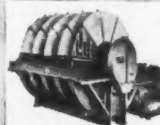
DENVER
Forced-Feed
JAW
CRUSHER



2 1/4" x 3 1/2"
to
36" x 48"

Cast Steel Frame, manganese jaw and cheek plates. Large diameter shafts reduce shaft deflection and thus increase life of heavy-duty, oversize roller bearings in bumper. Setting easily controlled. Please write for Bulletin No. C12-B12.

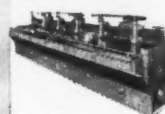
DENVER
Disc
FILTER



to
12 Disc, 9"
Tank
Agitator
can be
supplied

Special, patented design of segments in Denver Disc Filters use both gravity and vacuum to give a drier filter cake. Drainage is complete and positive, with no blow-back. Simple, low-cost, dependable construction. Quick delivery. Also Drum and Pkg Filters. Please write for Bulletin No. FG-B1.

DENVER
"Sub-A"
FLOTATION



Laboratory
and
Commercial

Flotation is the selective separation of particles from each other in a liquid pulp by means of air bubbles. More large plants are installing Denver "Sub-A's" for their entire flotation job, because they give maximum recovery at a low cost per ton. Dependable, low-cost, simplified continuous operation. Please write for Bulletin, No. F10-B81.

DENVER
Rubber Lined
PUMPS



Up to 2400
G.P.M.

Denver (Soft Rubber Lined) Sand Pumps lower pumping costs 30% to 70% due to simple design, lighter weight and accuracy of rubber parts which increase efficiency 1 1/2 to 3 times over other sand pumps. Have molded rubber impellers and casing liners for long life. Write for Bulletin No. P9-B8.

DENVER
Automatic
SAMPLERS



16" to 60"
Cutter
Travel

Heavy duty units, extra rigid track and ball-bearing wheels assure positive travel and timing of sample cutter. Available in stainless steel for acid and corrosive service. Wet and dry cutters. Central Control Panel for multiple samplers. Bulletin No. S1-B4.

DENVER-DILLON
Vibrating
SCREENS



1'x 3'
to
6'x 14'

Gives fast, clean separation without blinding. Gives even, smooth flow of material because of the patented "true-circle" eccentric action. Two-bearing construction saves 50% HP. Please write for Bulletin No. S3-B11.

DENVER
Spiral Rake
THICKENER



3'x 3'
to
80'x 12'

Enclosed, running-in-oil head motion. Patented spiral rakes move settled solids to center discharge with continuous motion, rapid removal of solids tends to eliminate overload. Wood, Steel or Rubber-lined Tanks available. Write for Bulletin No. T5-B5.

DENVER
Batch and
Continuous
TESTING



Laboratory
and
Pilot

Use Denver Testing Laboratory facilities for complete batch or pilot tests—your engineers or ours. Ample test facilities for investigations on crushing, grinding, mixing, classification, separation, sampling, leaching, concentration, thickening, filtration and drying. Consultation is without obligation. Please write for Bulletin No. T4-B15.



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When inquiring check 5424 opposite last page

The NEWEST **FALCON BLENDER**



THE FALCON
SANITARY BLENDER

Send for Bulletin

- Approved **SANITARY** by Municipal Authorities
- Unique Double Ribbon for Faster efficient Mixing
- All Sizes usually in Stock in Stainless or Mild Steel
- Requires Less Power, per load
- Smooth Rounded Interior No projections to retain material
- Ribbon Assembly quickly removable for cleaning
- Jackets Available for Heating or Cooling
- The FALCON is competitively priced

STAINLESS KETTLES, REACTORS, TANKS

The **FALCON** MANUFACTURING DIVISION OF

The FIRST MACHINERY CORP.
211 TENTH ST., BROOKLYN 15, N.Y. ST. 8-4672

When inquiring check 5425 opposite last page

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SPERRY FILTER PRESS

—Custom engineered to meet your specific requirements. Exact capacity . . . uniform product purity and stability.
—Ruggedly built to provide many years of trouble-free service. Minimum wear. Low maintenance.
—Adaptable for conversion to any type of filtration operation should changes in your product or process ever become necessary.
Sperry Filter Presses are available in a wide variety of materials and capacities. Write today for the complete catalog.

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- ☐ Send Free Sperry Catalog
- ☐ Have your representative contact us

Name _____

Company _____

Address _____

City _____

State _____

When inquiring check 5426 opposite last page

Computers

Starts on page 27

Diamond. This served a two-fold purpose. First, the test area, Sales Reporting, was considered complex and representative of similar data processing jobs and thereby offered comparative findings in a relative short period of time. Second, the test area forced both analyst and manufacturer to directly approach an existing company accounting problem completely and without the benefit of generalized or theoretical solutions. The problem defined became conversant and contributed to understanding of equipment principals, limitations and flexibilities.

Midway in the study an urgency arose for a "staff recommendation"; the feasibility study had not progressed to the point of economic analysis even though specific potential application areas were sighted. Computer costs, however, were known, as well as a universal (staff) opinion as to the most versatile and efficient system for generalized data processing of accounting requirements. Therefore, prematurely, a report was submitted to management recommending rental of an intermediate installation consisting of magnetic tape units and 4000 word magnetic drum storage. The investment required an expenditure of \$540,000 over three years.

The dollar impact of the report resoundingly resulted in a question as to whether or not a basic machine only, would suffice. Price Waterhouse & Company were engaged to review the economic stability of the proposed electronics program. What were the costs? Appropriate sized computer? Potential areas and their savings return?

The special services, electronics staff, of Price Waterhouse recommended and confirmed that:

- Equipment with sizable magnetic storage was required
- The application range was wide, volume modest and without any one sizable job

Turn to page 214

WHEN SPECS CALL FOR...

ACID PLANT VESSELS

for the
Chemical Processing
Industry
on the
West Coast



Save on transportation costs, manufacturing time and put yourself in a more competitive position by contacting an experienced "on the spot" source when planning the procurement of process and plant equipment for the West Coast. Send prints for prompt quotation on your next job.



Request
Brochure No. M-57



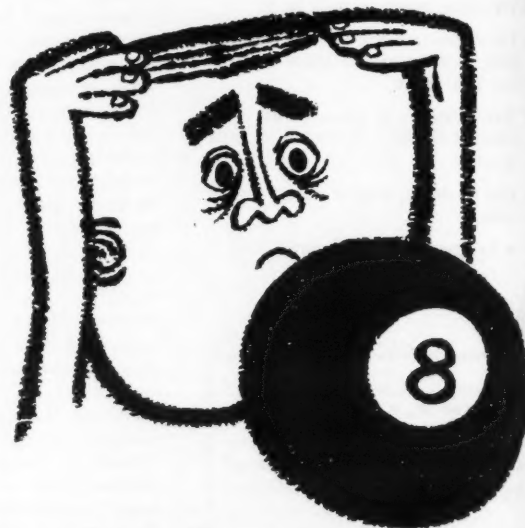
**FUGET SOUND
FABRICATORS, INC.**

Craftsmen in Metals

3670 E. Marginal Way • Seattle 4, Wash.

Craftsmen in steel plate and alloys up to 1"

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need more
information...

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... in the atmosphere
... in the water



Young HEAT EXCHANGERS

chosen to cool 1,000 hp twin-diesels
on the Saltiest
Sea on Earth!

*Great Salt Lake, Utah.
Once a great fresh water sea,
ten times its present area.



1,000 hp twin-diesels, power units of the tugs on this \$49,000,000 Southern Pacific project are cooled by YOUNG Model F Single Pass Heat Exchangers, constructed of special non-corrosive materials, treated to protect against dezincification.

For highly corrosive liquids or gas YOUNG *Stainless Steel Heat Exchangers* are designed to meet the specific needs of industry. Single pass or Multipass, they provide more cooling surface per unit volume, are engineered to withstand expansion strains with reserve capacity.

"WHERE QUALITY COUNTS"

Write today to Dept. 377-H
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Young

RADIATOR COMPANY

RACINE, WISCONSIN

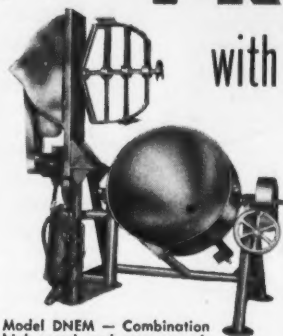
Creative HEAT TRANSFER ENGINEERS

Executive Office: Racine, Wisconsin, Plants at Racine, Wisconsin, Mattoon, Illinois

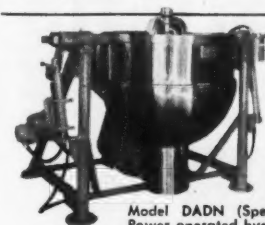
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AUGUST 1957

Assure **EFFICIENT PROCESSING** with **GROEN** mixer units

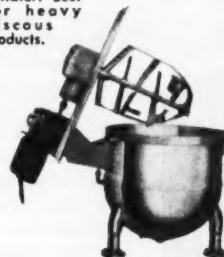


Model DNEM — Combination high-speed and scraper agitator produces emulsifying, blending action, assuring perfect mix even with small batch.



Model DADN (Special) — Power operated hydraulic tilt kettle Bottom drive double motion agitator. Easy to load . . . easy to dump.

Model DA — Conventional heavy-duty double motion agitator. Best for heavy viscous products.



MODEL TA

For extra heavy mixing. Has twin-shaft operating two sets of agitators for extra thoroughness. Especially excellent on heavy, viscous materials. Uses a wide variety of blenders, beaters, mixers. All parts instantly removable for easy cleaning.



AGITATOR
PARTS
QUICKLY
REMOVABLE
FOR EASY
CLEANING

There's deep-rooted efficiency in these agitator kettles because 50 years of know-how is factory-built into them. Cooking . . . cooling . . . mixing . . . they'll measure up to your most exacting requirements. In mixing, they swirl, beat, blend . . . gently or vigorously, as you will . . . with utter thoroughness. And in the function of cooking or cooling, nothing surpasses the GROEN steam jacket for fast, thru-and-thru heat or cold transfer. Stainless steel throughout. Simple to operate, easy to clean, entirely sanitary. They're cutting time and labor costs, improving production, for many of the big names in processing. Standard or specially engineered units. Check their potential against your problems. Contact us today for facts.

MODEL RA

Especially designed for medium to heavy mixing. Instantly demountable shaft coupling . . . all agitator parts quickly removable for cleaning. Finest cooking. Thorough mixing throughout batch.



GROEN MFG. CO., 4535 W. Armitage, Chicago 39 • 30 Church Street, New York 7

Half a Century of Fine Kettles
GROEN

When inquiring check 5430 opposite last page

for truly AUTOMATED CONTROL



No automation process can be better than the variable speed drive it uses

INSIST ON THE
Graham
most reliable variable speed drive made

- **ULTIMATE IN SIMPLICITY AND COMPACTNESS**—a straight line extension of a standard induction motor—or available without motor.
- **UNLIMITED SPEED RANGE**—from any desired maximum speed to zero, including reverse, without stopping motor.
- **UNMATCHED ACCURACY**—of speed setting and re-setting and speed holding.
- **NO PERISHABLE PARTS**—such as belts or tubes, requiring periodic replacement.
- **PROVED PERFORMANCE**—twenty years satisfactory use as standard equipment.
- **LOW COST**—a better job for less money.

GRAHAM TRANSMISSIONS, INC.
DEPT. CP • MENOMONEE FALLS, WISCONSIN

When inquiring check 5431 opposite last page

Specify **NAYLOR** PIPE and PIPE FITTINGS



**TO SPEED
THE JOB
AND
CUT COSTS**

**WATER LINES
AIR LINES
GAS LINES
COMPRESSED
AIR LINES
VENTILATING
LINES
PROCESS LINES
PNEUMATIC
CONVEYORS
SLUDGE LINES
VACUUM LINES
DRAINAGE LINES**

Here is a lightweight pipe with extra strength and safety to handle jobs normally requiring heavier-wall pipe. Its exclusive spiral-lock construction acts as a continuous expansion joint—absorbs shock loads, stresses and strains. Sizes range from 4" to 30" in diameter. All types of fittings, fabrications and connections including one-piece Naylor Wedge-lock couplings to speed installation and cut costs. Available in steel, alloys and stainless steel.

Write for Bulletins
No. 507 and No. 525

NAYLOR

Naylor Pipe Company
1260 East 92nd Street
Chicago 19, Illinois



Eastern U. S.
and Foreign Sales Office
90 East 42nd St.,
New York 17, N. Y.

When inquiring check 5432 opposite last page

Computers

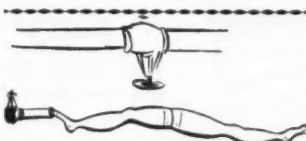
Starts on page 27

- Cash outlay would exceed \$500,000
- Intangibles should be dollar evaluated
- Potential areas—scientific and pseudoscientific should be surveyed for possible applications
- Economics, based on accounting-only applications, were not adequate to support an electronics program.
- A break-even in the ninth year was estimated

Electronic business data processing cannot be intelligently discussed without reference to basic input systems such as integrated data processing. Diamond has a 2500 mile private wire system interconnecting major company installations. The system initiates a branch office order and transmits *completed paper-work* (and five channel tapes) to all subsequent departments. The branch order is reviewed at Cleveland general offices and released to the designated plant where all shipping documents are automatically prepared. Upon shipment notification, Cleveland billing department uses teletype machines to invoice and automatically prepare output tape for conversion to tabulating cards; the cards supply all sales statistical data and accounts receivable debit postings. (Accounts receivable phase is scheduled for late 1957 start even though all data are programmed for in tape.)

The Diamond IDP (integrated data processing) system provided the nation's first

Turn to page 216



"Surely you recognize it as genuine nylon pipe, sir—"

this **NO-COST TEST OFFER**
has **CONVINCED** thousands
... send for YOUR FREE
"TEST CAN" of C-5 "hi-temp"
ANTI-SEIZE THREAD COMPOUND!

FEL-PRO
C-5
"HI-TEMP"
THREAD COMPOUND
QUART LBS.

For chemical plant uses, on all studs and bolts exposed to temperatures up to 1800°F, such as on compressor head assemblies, hot pump studs, autoclaves, reactor flange studs, heaters, heat exchangers, "cat" crackers, stainless steel assembly.

Try C-5 and see why leading refineries, manufacturers and power producers have made it part of their regular preventative maintenance program.

"HIGH-TEMP"

- ✓ Ends Seizing and Galling even up to 1800°F.
- ✓ Reduces Wrench Torque
- ✓ Ends Stud Breakage
- ✓ Permits Repeated Re-use
- ✓ Speeds Assembly and Disassembly
- ✓ Protects Stainless Steel at all Temperatures

ANTI-SEIZE THREAD COMPOUND
C-5's exclusive colloidal copper formula separates mating metal threads and surfaces with cushioning, protective copper plating. C-5 prevents galvanic action and eliminates pitting even when dissimilar metals join. On mating metal surfaces, C-5 saves gaskets and countless man hours.
WRITE TODAY... For Your FREE Test Sample Can of C-5.
FELT PRODUCTS MFG. CO.
1515 Carroll Ave., Chicago 7, Illinois

When inquiring check 5433 opposite last page

WARMS UP FAST!

The **UNITRAP** hits peak performance in seconds—a real production booster on intermittent operation and morning start-ups.

The Unitrap saves money on any operation. Large orifices and the exclusive Dual-Valve provide tremendous capacity and reduce wire drawing. Universal pressure from 0 to 250 lbs. simplify parts and trap inventories—you simply order by pipe sizes (1/2" through 2"). Stainless steel working parts last indefinitely. For full information contact our nearest office or write for Bulletin 800C. *Pat. Pending

"WHERE
Good Connections
COUNT"®

PERFECTING SERVICE CO.
332 Atando Ave. Charlotte, N. C.
Baltimore—Camden, N. J.—Chicago—Cleveland—Los Angeles—New York—Providence—Montreal—Toronto

When inquiring check 5434 opposite last page

CHEMICAL PROCESSING

ST
FER
sands
E
i-temp
POUND!

es, on all
mperatures
compressor
studs, auto-
s, heaters,
kers, stain-

ading re-
and power
f their reg-
e program.

up to 1800°F.

mbly
temperatures

UND

On mating
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B.
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G. CO.
jo 7, Illinois

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UP
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D.
c.

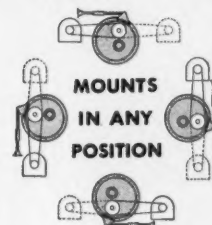
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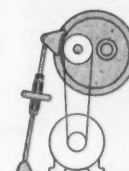
**Efficient
speed reduction
in limited space**

SIX SIZES— $\frac{1}{2}$ to 30 HP—420 to 10 rpm—single and two double reduction ratios. Output torque ratings up to 21,000 lb-in.

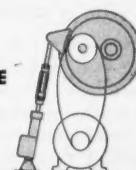
A FEW OF THE MANY APPLICATION FEATURES



**MOUNTS
IN ANY
POSITION**



VARIABLE SPEEDS
through use of vari-
able-pitch sheaves
—automatic belt ad-
justment with tie-rod
adjustment



OVERLOAD RELEASE
that will slacken belts
and cut off power if
overload occurs

FALK ALL-STEEL Shaft Mounted Drives

Wherever you require a highly efficient, economical speed reducing unit to fit into a limited space, the FALK All-Steel Shaft Mounted Drive meets your needs perfectly. This rugged, compact reducer mounts directly on the driven shaft and is driven through V-belt or chain drive from any convenient rotating power source.

It's hard to match the versatility of a Falk Shaft Mounted Drive. You can choose a single or double reduction unit and use it with any of the many possible sheave or sprocket ratios to obtain almost any specified speed between 420 and 10 rpm. Equally important, the standard Falk Shaft Mounted Drive is available for horizontal and vertical application. Delivery is immediate, installation is quick and easy.

These units are completely FALK-designed and FALK-built for a long life of dependable, trouble-free service. Precision-cut helical gears of highest efficiency are employed for efficient, quiet operation.

Always available promptly from factory and distributor stocks, from coast to coast. For details, ask your Falk Representative or Distributor—or write for **Bulletin 7101**.

For more information on product at right, specify 5435 see information request blank opposite last page.



THE FALK CORPORATION, 3001 W. CANAL ST., MILWAUKEE 1, WIS.

Representatives and Distributors in Most Principal Cities

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|------------------|--|---|--|
| Manufacturers of | <ul style="list-style-type: none"> • Motoreducers • Speed Reducers • Flexible Couplings • Shaft Mounted Drives | <ul style="list-style-type: none"> • High Speed Drives • Special Gear Drives • Single Helical Gears • Herringbone Gears | <ul style="list-style-type: none"> • Marine Drives • Steel Castings • Weldments • Contract Machining |
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FALK
...a good name in industry

Variable Speed Drive
Output adjustable from
0 to 150 ml/sec.

"MIDGET" Constant Discharge
2 to 20 cc/sec. range

Fixed Capacities
11 to 220 ml/sec;
10 to 217 gph.

MAISCH

METERING PUMPS

- STAINLESS STEEL — OILLESS BEARINGS — STERILIZABLE
- POSITIVE DISPLACEMENT — SMOOTH, NON-PULSATING FLOW
- FOR HOT, COLD, VISCOUS OR WATERY FLUIDS
- ACCURATE WITHIN 1 TO 2%

Maisch Metering Pumps are simple in design, ruggedly built for long service, and can be depended on to maintain accuracy indefinitely. Exclusive design features insure optimum performance. Particularly suited for handling chemicals, syrups, oils, glue, processing solutions, etc: Quick demountable or fixed heads. Fixed capacity pumps available in wide range of output. Pumps in stock for immediate delivery. Write for complete details and prices.

MECHANICAL PRODUCTS CORPORATION
176 North Ogden Avenue • Chicago 7, Illinois

When inquiring check 5436 opposite last page

**fast, easy
way to
install
pipe
under
ground**

...with a **GREENLEE** Hydraulic Pipe Pusher

Teamed with a portable power pump, as shown above, this powerful **GREENLEE** Pusher greatly simplifies installation of pipe under streets, floors, tracks, walks, and lawns. Average pushing performance for this equipment is *two feet per minute*. No tearing up of concrete, flooring, tracks, etc. Eliminates extensive ditching, tunneling, backfilling. Cuts job time to a fraction — often pays for itself on first job. Two models . . . one for pipe up to 4", the other for pipe over 4", drainage ducts, concrete sewer pipe. Both one-man-operated either by hand or with power pump. Write for complete details.



GREENLEE TOOL CO., 2388 Herbert Ave., Rockford, Ill.

When inquiring check 5437 opposite last page

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Computers

Starts on page 27

end-to-end . . . order, shipping, billing, sales reporting . . . system. The speed of moving orders has been helpful; approximately 86 percent of all data is automatically transcribed at each operating level. Such a system is basic and essential to a centralized computer approach.

A major modification in the Diamond system, planned for mid-1957 completion, will improve service and further minimize tape coding; the coding selects, "reviews" or deletes information as required for each type of document. Working closely with Ohio Bell Telephone Company and the parent A.T. & T. organization, Diamond analysts over three years have contributed to more versatile communication equipment. Further improvements are currently being studied. Even though Diamond does not anticipate its own computer for some time, IDP will allow for data transmission on a well-experienced system most fundamental to successful electronics.

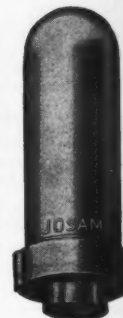
The Diamond "pay-as-you-go" short range plan to use a service bureau's medium-scale computer is not universal practice with moderate-size users. But, nevertheless, how better can one gain faster results with a minimum risk? Practical economics rests with future electronics equipment, and not with current-day machines for answering modest paperwork volumes. ■

if you're a VIP . . .
don't miss page 195

PREVENT BREAKS AND LEAKS IN CONNECTIONS AND VALVES due to WATER HAMMER

with **Josam**

SHOCK ABSORBERS



● The pounding, shaking noise that occurs repeatedly in many pipe lines is "Water Hammer" — as destructive as it is noisy — loosening fittings, damaging valves, connections and appliances, and causing extensive repairs! **JOSAM SHOCK ABSORBERS** easily, inexpensively and permanently prevent hammering and vibration in pipe lines.

Write for free literature
and latest scientific data.

JOSAM MANUFACTURING COMPANY
Dept. CP-8 Michigan City, Indiana

Representatives in all principal cities.

Josam products are sold through plumbing supply wholesalers.

When inquiring check 5438 opposite last page

LENAPE

MANWAYS and FITTINGS

**A wide variety
of access openings.**

Lenape elliptical access openings (straight rings or flued and curved saddles) and fittings, of the pressure loaded or "self-energized" type are produced in sizes ranging from 4" x 6" to 18" x 24".

11 x 15" N Fitting.

Typical Lenape Fittings

- 11 x 15" Type L 150 PSI in steel, Everdur, and 304 Stainless.
- 11 x 15" Type N 450 PSI for general application.
- 11 x 15" Type S 250 PSI with external split recessed clamp plate for paper machine dryers
- 12 x 16" Type N 450 PSI for general application.
- 12 x 16" Type HP 800 PSI for heavy duty.
- 14 x 18" 300 PSI Hinged for beverage tanks.
- 18 x 24" 200 PSI for large clean-outs.

Full details are found on pages
42 to 49 of Lenape Catalog 10-53.

LENAPE HYDRAULIC PRESSING & FORGING CO.
DEPT. 100 WEST CHESTER, PA.

When inquiring check 5439 opposite last page

CHEMICAL PROCESSING



Have you changed your address recently?

● If so, you'll want to insure that your copy of **CHEMICAL PROCESSING** reaches you without interruption. Just send us your new address . . . use the convenient form below.

Please answer all questions in regard to your new affiliation, and in addition give us your former address including company, city and state.

mail this request to
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CHEMICAL PROCESSING**

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Chicago 11, Illinois

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Former Address

.....
Your Name Present Title

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Present Company

.....
Main Product

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Rating of Company

.....
Street Address

.....
City Zone No. State



Tariffs—Lloyd

Starts on page 30

have been operating at capacity. Foreign industry—chemical and other—has been increasing rapidly and will continue to do so. Germany now has chemical capacity about 100% more than domestic needs and is still building new, efficient plants.

As foreign capacity expands, American producers will meet increased competition, both in third markets (both the US and a foreign country selling to a third country) and also in the home market. Chemical industry growth in Europe has led the field with new, efficient plants based on petrochemicals. With abundant, cheap, near-East crude, they are making great strides in this field. Production of petrochemicals in the United Kingdom, West Germany, France, Italy, and Holland will have increased 3½ times in the five years from 1953 to 1958, at which time it will be more than 1.5 billion pounds per year. In the face of this, the chemical industry most certainly can expect increasing foreign competition. Industry will be losing foreign export markets at the time increased imports are contending for the domestic market.

A careful appraisal of the real world in which we live shows that there are many unnatural advantages which have been created by sovereign nations. Political factors, not natural advantage and economic efficiency, will determine where production takes place if free trade is applied under present conditions.

Until such time as wage costs are more nearly equal, until there is much less danger of war, until the nations of the world are willing to lay aside their socialistic schemes of trying to live beyond their means and have curbed their inflationary fiscal policies . . . until then it is not time for free trade. Under present conditions, the United States should maintain sufficient tariffs to offset part of the advantage which foreign competitors have through their "sweat-shop" labor costs. ■

THE BIG NEWS

In Blends, Emulsions, Dispersions **GAULIN** "Particle Control"

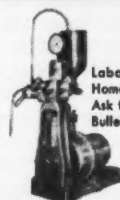
Look what Gaulin *Particle Control* can do for your product . . .

- Improve texture, make a finer, more uniformly stable emulsion.
- Accent taste, scent and color. Lock in subtle flavors and fragrance against evaporation.
- Keep it always good to look at by stopping separation — no

more "shake well before using"!

How about your product?

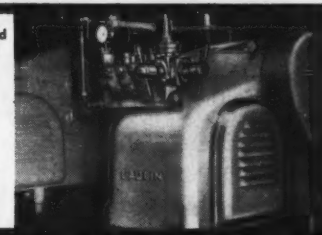
Chances are a Gaulin Homogenizer can help improve some food, beverage or chemical you make. Try this dramatic new approach to blending with a Laboratory Homogenizer for only \$75.00 a month.



Laboratory Homogenizers
Ask for
Bulletin LH-55



New Re° Colloid
Mills — Ask for
Bulletin C-57



Homogenizers and Sub-Micron Dispersers
Ask for Bulletins H-55 and SMD-55.



The G.T.A. Library of
Product Information

Ask for G. T. A. — Gaulin Technical Assistance — for experienced advice and factual data on the best method to mix or move your product. Complete research and test facilities to help you. Write for FREE booklets to get you started. Manton-Gaulin Manufacturing Co., Inc., 55 Garden St., Everett 49, Mass.



ME7-14

When inquiring check 5440 opposite last page

SOME THINGS WE CAN'T SEPARATE



But WE CAN SEPARATE

OIL • LIGHTENDS • MIST
SLUGS • CARRYOVER

FROM

GAS • STEAM • VAPOR • AIR

We can't get blood out of a turnip, but we can separate just about anything you can name from any gas or vapor. Patented Anderson Hi-eF Purifiers are different from ordinary mist extractors, scrubbers

and separators. They're virtually 100% efficient and yet contain no moving parts, costly filters, or mesh screens. Each unit is individually guaranteed. Ask us to show you what we can do for you.



FREE PURIFICATION BOOKLET



THE V. D. ANDERSON COMPANY
Division of International Basic Economy Corporation
1948 West 96th Street • Cleveland 2, Ohio
Please send your purification booklet without obligation.

Name _____
Company _____
Address _____
City _____ State _____

PURIFIERS • SCRUBBERS • SEPARATORS • MIST EXTRACTORS

When inquiring check 5441 opposite last page

PALMER-SHILE

Materials HANDLING EQUIPMENT

Engineered and Built
to meet your needs

LIFTS OPEN and CLOSED DRUMS

Vertical DRUM LIFTER

Item C-1258

\$49.80

Save valuable plant space with this improved Vertical Drum Lifter. Handled either by crane or hoist, and used where ceilings are high or low. Sure-hold safety-grip is one of its important features. All steel welded construction.

PICKS UP BARREL, BOX OR CONTAINER

BARREL and BOX GRAB

Item NS-288
(2000 lb. capacity)

\$72.40

From 40" diameter to small nail keg. Available in 1000 and 2000 lb. capacity. Toggle principle design. Rugged construction of welded steel chain with tongs of heavy bar stock. Weight app. 35 lbs.



Item NS-288-L
\$63.10

BARRELS WEIGHING UP TO 1000 LBS. HANDLED WITH EASE BY A

BARREL TRUCK

loads automatically

Loads from a row as easily as when barrel stands alone. Only 24" wide, permitting passage thru doors or down aisles too narrow for many trucks. All welded steel construction. Weight app. 85 lbs.

Item S-911-M \$43.70
(metal wheels)

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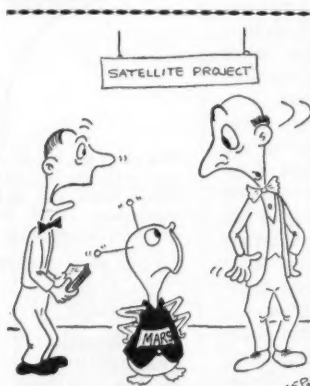
Patents

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One suppression story that has appealed to several successive generations concerns an improved carburetor which would permit an automobile to be driven 75 to 100 miles for every gallon of gasoline; and the story has it, in one version or another, that the 'gasoline interests' have somehow contrived to suppress this invention, in order to protect their investments. A somewhat similar story concerns a magic pill of some sort, which could be dropped into a tank full of water to convert it into the equivalent of gasoline.

"Despite the frequency with which such stories are heard, and the knowing air with which they are bandied about, nobody seems to have been able to nail down any solid factual basis for them, or to learn where, how, when, and by whom any such suppression has actually occurred.

"Some years ago, The American Chemical Society made a very extensive inquiry among its members in an attempt to either develop the truth of such charges or to show the absence of any basis for them. This investigation failed to turn up any single instance of true suppression. Former US Patent Commissioner Casper W. Ooms has reported that during his term of office he enlisted the aid of

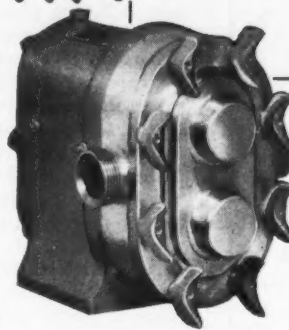


"Claims we're infringing on his patents."

Thanks to George E. Pekarek, The Glidden Company, Cleveland



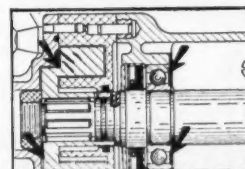
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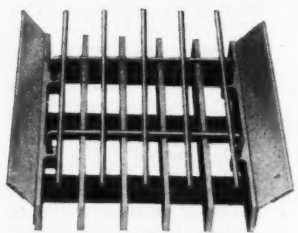
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the FBI in such an investigation with the same result.

"Of course, it is always hard to 'prove a negative.' The unanimity of informed opinion, however, should be persuasive of what the facts really are. Even more to the point, perhaps, is the fact that suppression 'just doesn't make sense' — for a variety of reasons:

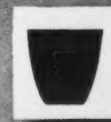
"In the first place, once a patent is issued it can be read by any member of the public. Moreover, it is common knowledge that today, competition begins in the laboratory. Technological progress comes ever more rapidly, and its corollary, of course, is a high rate of technological obsolescence. Accordingly, the useful life span of any invention is unpredictable; no one can forecast when it can become practically worthless. If the owner of an invention moves fast in putting his invention to use he may be able to profit by it, but if he does not, it is likely he will be outdistanced by his competitors.

"Furthermore, the Government, since 1910, has been able to take advantage of a statute authorizing it to use any patented invention, with reasonable compensation to the owner; and, of course, the Government always has the right of eminent domain. If any of the familiar stories about fabulous carburetors and magic substitutes for gasoline were true, it would seem only reasonable that the Government would long since have snapped up these 'inventions' for its own use.

"Mere non-use of an invention should not be confused with suppression. A great many inventions are not used for the reason that they are just not good enough to compete with other things which are available, or not good enough to create a new market. No doubt many stories of suppression started with disgruntled inventors whose inventions could not meet the test of the market place. ■

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... is told by Dr. D. S. Davis, in the first of 6 installments in Processing & Engineering Data Section on page 71.



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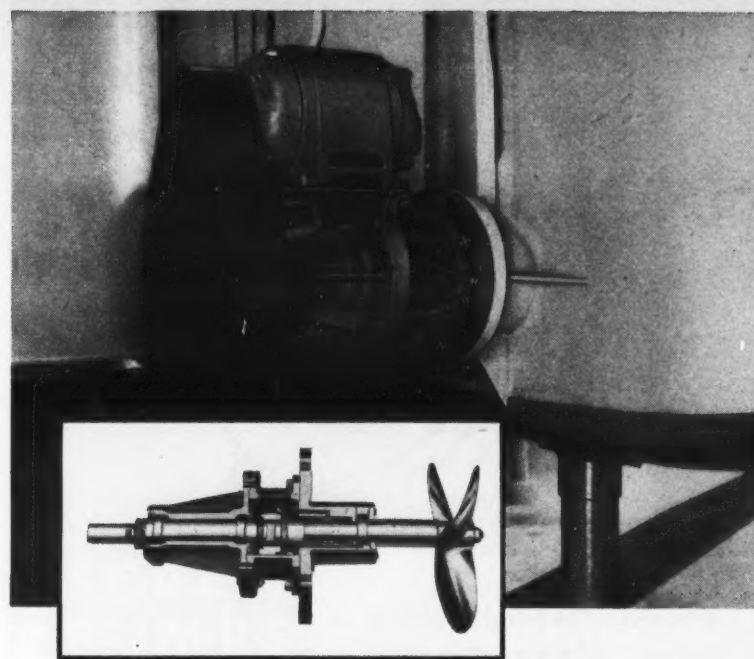
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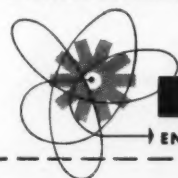
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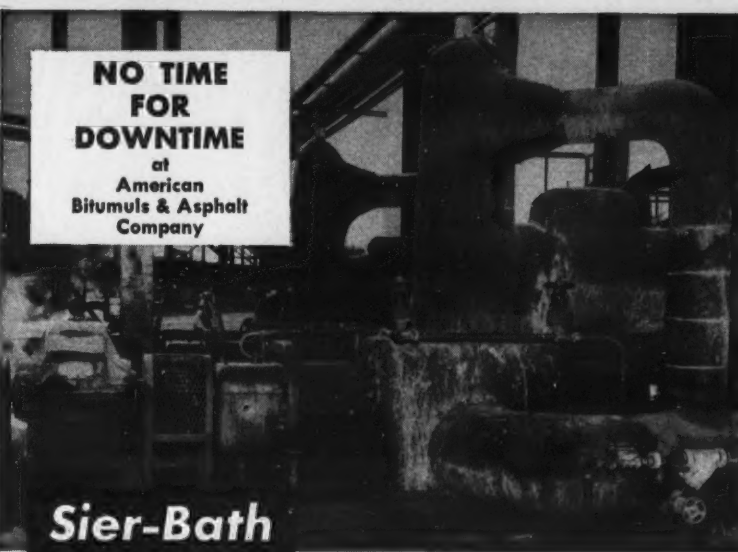
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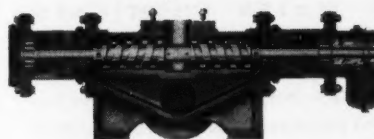


**Sier-Bath
SCREW
PUMPS**

— provide low-cost, reliable heavy-duty pumping service 24 hours a day, 7 days a week

• Shown above are two external bearing type Sier-Bath Screw Pumps at the Cincinnati refinery, charging low gravity crude oil to an asphalt unit. These steam-jacketed pumps have been handling crude oil with a viscosity of 10,000 SSU at 100°F. in 'round the clock operation for a period of 2½ years, with minimum routine maintenance.

Sier-Bath SCREW PUMPS



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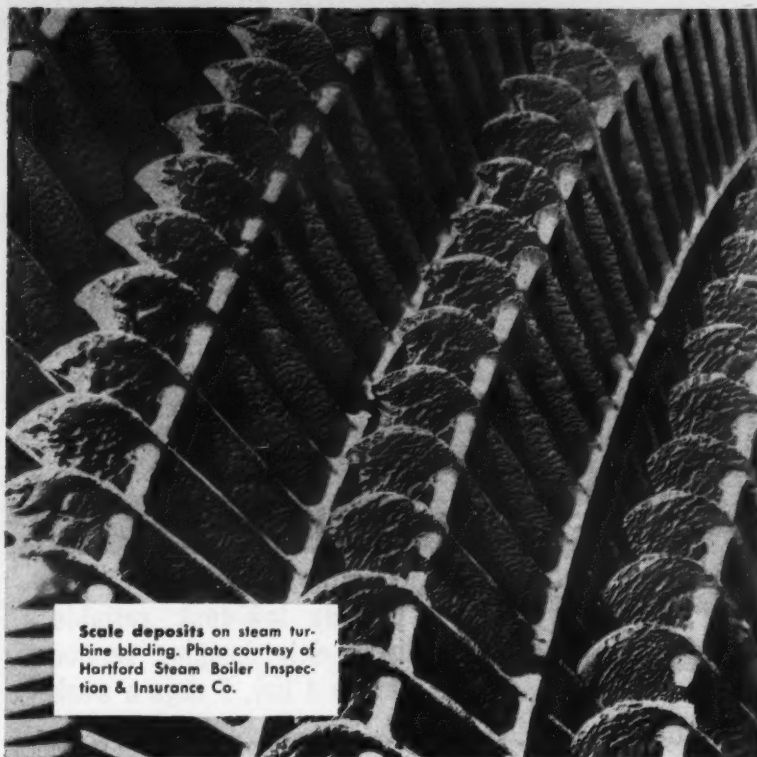


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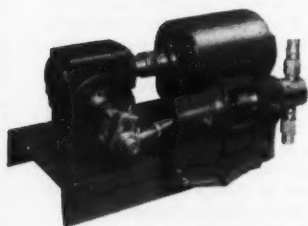


Scale deposits on steam turbine blading. Photo courtesy of Hartford Steam Boiler Inspection & Insurance Co.

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... WHEN MODEL 1106 PROPORTIONEER FEEDS BOILER WATER CHEMICALS

Prevent scale build-up (caused by boiler carry-over) on turbine blades with proper raw water or internal steam boiler treatment. Model 1106 Proportioneer feeds all chemicals (alkaline, neutral, or acid) accurately (guaranteed within $\pm 1\%$) over 15 to 1 range. Capacities range from 0.11 to 35.6 GPH ... for discharge pressures up to 1100 psig.



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DIVISION OF

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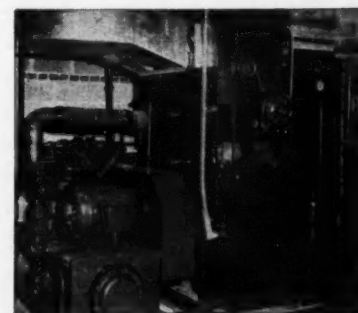
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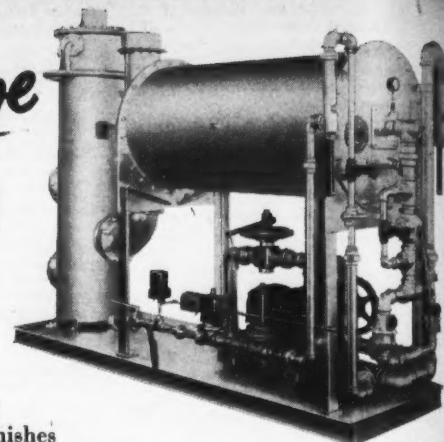
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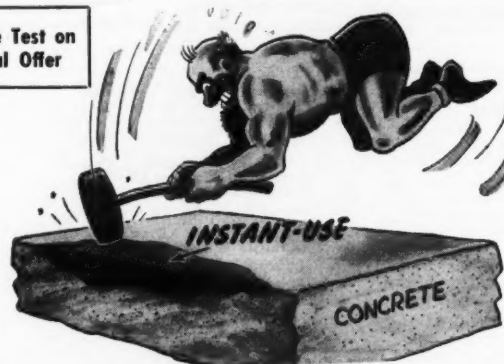
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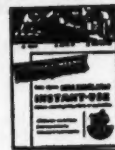
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5004a	Wire Cloth	5067b	Sodium Sulfide	5129a	Teflon Packings	5194	Belt-conveyor Idlers
5004b	Wire Cloth Fabrication	5067c	Sodium Sulphhydrate	5129b	Teflon Seal Gages	5195	Fork-lift Trucks
5005	Butyl Rubber	5067d	Fluorolubes	5130	Fluorine Polymer Coating	5196	Rotary Compressor
5006	Dust Control Systems	5067e	Sodium Chlorate	5131	Zirconium Vessels	5197	Dumper
5007	Dryers	5067f	New List of Products	5132	Plastic-lined Pipe, Valves & Fittings	5198	Turntable Conveyors
5008	Metal Fabrications	5068	Mono Laurates DI (state which)	5133	Acid Handling Pumps	5199	Vibratory Feeder
5008a	Plant Sites	5069	Liquid Detergents	5134	Unions	5200	Electromagnetic Separators
5009	Continuous Centrifuge	5070	Organic Chemicals	5135	PVC Pipe & Fittings	5201	Conveyor-separator
5010	Crystallizers	5071a	Germicides	5136	Vinyl Plastisols	5202	Vibrators
5012	Dust Collectors	5071b	Fungicides	5137	Teflon Mechanical Seal	5203	Concrete Stave Storage Bins
5013	Corrosion-resistant Glassed Pumps	5071c	Preservatives	5138	Protective Clothing & Footwear	5204	Casters & Wheels
5014	Diaphragm Pump	5071d	Antioxidants	5139a	Horizontal Pumps	5205	Telescopic Conveyor
5015	Corrosion-resistant Plastic Pipe	5071e	Industrial Aromatics	5139b	Vertical Pumps	5206	Roller Chain Conveyor
5016	Slide Valve	5072	Isocyanate Adduct	5140	Stainless Steel	5207a	Corrugated Bulk Packs
5017	Expansion Joint	5073	Glycol Monosuccinate	5141	Teflon Packings	5207b	Boxes
5018	Variable-speed Drive	5074	Filter Aids	5142	Chlorine Valve	5208	Precision-type Cutters
5019	Refractory Castables	5075	Preservatives	5143	Sprayed Metal Coatings	5209	Bulk Handling Equipment
5020	Glycerine	5076	Teflon	5144	Lined Gages	5210	Conveyors
5021	Red Iron Oxides	5077	Textile Softener	5145	Plastic Pipe	5211	Gas Cylinders
5022	Plastic Liners	5078	Phenolic Molding Compound	5146	Tee-head Bolts	5212	Fiberglass Trays
5023	Hypalon-lined Valve	5079	Coating and Molding Material	5147	Urethanes	5213a	Tubular Conveyors
5025	Hypalon	5080	Liquid Ultra Accelerator	5148	Urethanes Coatings	5213b	Bucket Elevators
5026	Degreasing Emulsifiers	5081	Sesquiterpene Fractions	5149a	Teflon Sheet Packing	5214	Car Shakers
5027a	Zirconium & Hafnium	5082	High Polymer Alkyd	5149b	Neoprene Sheet Packing	5215	Fork-lift Trucks
5027b	Isobutric Acid	5083	Preservatives (info — state which)	5150	Industrial Enclosed Switches	5216	Tilting Hand Truck
5027c	Sodium Dispersions	5084	Sulfur Derivative	5152	Flow Meters	5217	Transfer Bin
5027d	Technical Developments (state number)	5085	Optical Bleach	5153	Feeders	5218a	Collmount Oscillating Conveyor
		5086	Surfactants	5154	Strip-chart Recorders		
		5089	Condenser Tubes	5155	Switch Seals		
		5090	Antioxidants	5156	Weighing Systems		
		5091	Butyl Rubber				

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✓ Key	Description	✓ Key	Description	✓ Key	Description	✓ Key	Description
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<input type="checkbox"/> 5219	Oscillating Conveyor	<input type="checkbox"/> 5282	Heat Exchanger Tubes	<input type="checkbox"/> 5343	Zirconium	<input type="checkbox"/> 5400	Conveyor and Elevator Belts
<input type="checkbox"/> 5220	Material-handling & Processing Equipment	<input type="checkbox"/> 5283	Vaporizers	<input type="checkbox"/> 5344	Radiation Shielding Windows	<input type="checkbox"/> 5401	Motor-driven Trolley
<input type="checkbox"/> 5221	Weigh-hopper	<input type="checkbox"/> 5284	Centrifugal Mixers	<input type="checkbox"/> 5345	Plate Magnets	<input type="checkbox"/> 5402	Water Tanks
<input type="checkbox"/> 5222	Industrial Lift Trucks	<input type="checkbox"/> 5284A	Water and Waste Treatment Equipment	<input type="checkbox"/> 5346	Spectrochemical Analyzers	<input type="checkbox"/> 5403	Rotary Dryer
<input type="checkbox"/> 5223	Industrial Lift Trucks	<input type="checkbox"/> 5285	Dust Collector	<input type="checkbox"/> 5347	Corrosion-resistant Coatings	<input type="checkbox"/> 5404	Deminerallizers
<input type="checkbox"/> 5223	Bag Closer	<input type="checkbox"/> 5286	Finned Condenser Tube	<input type="checkbox"/> 5348	Corrosion-resistant Tank Linings	<input type="checkbox"/> 5405a	Base-mounted Pumps
<input type="checkbox"/> 5224	(see ad—state use)	<input type="checkbox"/> 5287	Muller-type Mixers	<input type="checkbox"/> 5349	Portable Pyrometer Indicator	<input type="checkbox"/> 5405b	Close-coupled Pumps
<input type="checkbox"/> 5224	Plastics in Bulk	<input type="checkbox"/> 5288	Filters	<input type="checkbox"/> 5350	Mixing and Storage Tanks	<input type="checkbox"/> 5406	Steel Fabrications
<input type="checkbox"/> 5225	Bulk-plastics Trailers	<input type="checkbox"/> 5289	Blenders	<input type="checkbox"/> 5351	Cellophane	<input type="checkbox"/> 5407	Corrosion-resistant Pumps
<input type="checkbox"/> 5226	Case Sealing Machine	<input type="checkbox"/> 5290	Teflon Filter Sheet	<input type="checkbox"/> 5352	Extraction Process	<input type="checkbox"/> 5408	High Density Felts
<input type="checkbox"/> 5227	Lined Steel Containers	<input type="checkbox"/> 5291	Controlled-volume Chemical Pump	<input type="checkbox"/> 5353	Vibrating Screen Separator	<input type="checkbox"/> 5409	Stainless Steel Valves
<input type="checkbox"/> 5228	Drum & Package Liners	<input type="checkbox"/> 5292	Hi-turbulent Heater	<input type="checkbox"/> 5354	Insulated Unions, Nylon Sleeves, and Washers	<input type="checkbox"/> 5410	Fork-lift Trucks
<input type="checkbox"/> 5229	Bag Closer	<input type="checkbox"/> 5293	Heat Exchangers	<input type="checkbox"/> 5355	Water Bath Controllers	<input type="checkbox"/> 5411	Compressors
<input type="checkbox"/> 5230	Self-adhesive Labels	<input type="checkbox"/> 5294	Mixer-disperser	<input type="checkbox"/> 5356	Gage, Thermometer, and Recorder Accessories	<input type="checkbox"/> 5412	Liquid Meters
<input type="checkbox"/> 5231	Air & Electric Vibrators	<input type="checkbox"/> 5295	Drum Filters	<input type="checkbox"/> 5357	Tube Maintenance Equipment	<input type="checkbox"/> 5413	Spray Nozzles
<input type="checkbox"/> 5232	Polyethylene Drum-closures	<input type="checkbox"/> 5296	Roller Mill	<input type="checkbox"/> 5358a	Propeller, Paddle, Turbine Mixers	<input type="checkbox"/> 5414	Piston Packing
<input type="checkbox"/> 5233	Corrugated-bulk Containers	<input type="checkbox"/> 5297	Mobile Filter	<input type="checkbox"/> 5358b	Top Entering Propeller Mixers	<input type="checkbox"/> 5415	Liquid-gas Separator
<input type="checkbox"/> 5234	Drum Lining	<input type="checkbox"/> 5298	High-speed Mixer	<input type="checkbox"/> 5358c	Portable Mixers	<input type="checkbox"/> 5416	Pushbutton Stations
<input type="checkbox"/> 5235	Portable Bag Closer	<input type="checkbox"/> 5299	Fabricated Vessel & Process Equipment	<input type="checkbox"/> 5358d	Side Entering Mixers	<input type="checkbox"/> 5417	Centrifugally Cast Tube Converters
<input type="checkbox"/> 5236	Liquid-filling Machine	<input type="checkbox"/> 5300	Vertical Leaf Pressure Filters	<input type="checkbox"/> 5358e	Laboratory Mixers	<input type="checkbox"/> 5418	Steel Fans
<input type="checkbox"/> 5237	Bin-level Indicators	<input type="checkbox"/> 5301	Batch-master Centrifugal	<input type="checkbox"/> 5358f	All Types Mixers	<input type="checkbox"/> 5420	Multipoint Valves
<input type="checkbox"/> 5238	Corrugated Drum	<input type="checkbox"/> 5302	Process Equipment	<input type="checkbox"/> 5358g	Mechanical Seals	<input type="checkbox"/> 5422	Gilsonite-asphaltic Mastics
<input type="checkbox"/> 5239	Lined Containers	<input type="checkbox"/> 5303	Cooling Towers	<input type="checkbox"/> 5358h	Mixer Requirements	<input type="checkbox"/> 5423	Liquid-solids Blenders
<input type="checkbox"/> 5240	Scales	<input type="checkbox"/> 5304	Belt Conveyor Idlers	<input type="checkbox"/> 5359	Grinders, Shredders, Hashers	<input type="checkbox"/> 5424a	Agitators & Mixers
<input type="checkbox"/> 5241	Bag Closer	<input type="checkbox"/> 5305	Mechanical Seals	<input type="checkbox"/> 5360	Dumping Trailers	<input type="checkbox"/> 5424b	Ball Mills
<input type="checkbox"/> 5242	Steel Drum	<input type="checkbox"/> 5305A	Zinc-clad Aluminum	<input type="checkbox"/> 5361	Draughting Equipment	<input type="checkbox"/> 5424c	Ice Crusher
<input type="checkbox"/> 5243	Joint Sealing Compound	<input type="checkbox"/> 5306	Elemental Boron	<input type="checkbox"/> 5362	Organic Chemicals	<input type="checkbox"/> 5424d	Disc Filter
<input type="checkbox"/> 5244	Industrial Gloves	<input type="checkbox"/> 5307	Protective Concrete Coating	<input type="checkbox"/> 5363	Welding Electrodes	<input type="checkbox"/> 5424e	Filtration Separator
<input type="checkbox"/> 5245	Automatic Tape Dispenser	<input type="checkbox"/> 5308	Industrial Buildings	<input type="checkbox"/> 5364	Dust Control System	<input type="checkbox"/> 5424f	Rubber-lined Pump
<input type="checkbox"/> 5246	Foreign Import Requirements	<input type="checkbox"/> 5309	Wire Mesh	<input type="checkbox"/> 5365	Protective Coatings	<input type="checkbox"/> 5424g	Automatic Sampler
<input type="checkbox"/> 5247	"P" Style Cans	<input type="checkbox"/> 5310	Dust Collectors	<input type="checkbox"/> 5366	Sulfuric Acid Handling	<input type="checkbox"/> 5424h	Vibrating Screen
<input type="checkbox"/> 5248	Skin Protection Cream	<input type="checkbox"/> 5311	Gate Valves	<input type="checkbox"/> 5367	Steam-jet Ejector	<input type="checkbox"/> 5424i	Spiral Rake Thickener
<input type="checkbox"/> 5249a	Electric Lanterns	<input type="checkbox"/> 5312	Telescoping Wireway Fitting	<input type="checkbox"/> 5368	Water-lubricated Submersible Pumps	<input type="checkbox"/> 5424j	Batch & Continuous Testing
<input type="checkbox"/> 5249b	Safety Cans	<input type="checkbox"/> 5313	"Package" De-ionizer	<input type="checkbox"/> 5369	Vermiculite	<input type="checkbox"/> 5425	Blenders
<input type="checkbox"/> 5250	Scale Cleaners	<input type="checkbox"/> 5314	High-pressure Gages	<input type="checkbox"/> 5370	Urethane Polymers	<input type="checkbox"/> 5426	Heat Press
<input type="checkbox"/> 5251	Chemical Pumps	<input type="checkbox"/> 5315	Moldable Insulation	<input type="checkbox"/> 5371	Laboratory Safety Manual	<input type="checkbox"/> 5427	Acid Plant Vessels
<input type="checkbox"/> 5252	Chemical Faucets	<input type="checkbox"/> 5316a	Metering & Proportioning Pumps	<input type="checkbox"/> 5372	Aluminum Corrosion-resistance Guide	<input type="checkbox"/> 5428	Heat Exchangers
<input type="checkbox"/> 5253	Indicating Tape	<input type="checkbox"/> 5316b	Diaphragm Valves	<input type="checkbox"/> 5373	Pilot Plant Equipment	<input type="checkbox"/> 5430	Mixer Units
<input type="checkbox"/> 5254	Fire Detectors	<input type="checkbox"/> 5317	Dust Filters	<input type="checkbox"/> 5374	Teflon Sheet, Tape, Film	<input type="checkbox"/> 5431	Variable Speed Drives
<input type="checkbox"/> 5255	Breathing Equipment	<input type="checkbox"/> 5318	Flexible Coupling	<input type="checkbox"/> 5375	Nickel-base Alloys	<input type="checkbox"/> 5432	Pipe & Fittings
<input type="checkbox"/> 5256	Safety Goggles & Headgear	<input type="checkbox"/> 5319	Wire Slings	<input type="checkbox"/> 5376	Zirconium	<input type="checkbox"/> 5433	Anti-seize Thread Compound
<input type="checkbox"/> 5257	Valves	<input type="checkbox"/> 5320	Insulating Blocks & Cement	<input type="checkbox"/> 5377	Process Controllers	<input type="checkbox"/> 5434	Steam Trap
<input type="checkbox"/> 5258	Saran-lined Pipe	<input type="checkbox"/> 5321a	Teflon Bellows	<input type="checkbox"/> 5378a	Double-suction Pumps	<input type="checkbox"/> 5435	Shaft-mounted Drives
<input type="checkbox"/> 5259	Dust Collectors	<input type="checkbox"/> 5321b	Flexible Couplings	<input type="checkbox"/> 5378b	Multi-stage Pumps	<input type="checkbox"/> 5436	Metering Pumps
<input type="checkbox"/> 5260a	Eye-wash Fountain	<input type="checkbox"/> 5322	Ultrasonic Transducers	<input type="checkbox"/> 5378c	Split-shell Pumps	<input type="checkbox"/> 5437	Hydraulic Pipe Pushers
<input type="checkbox"/> 5260b	Emergency Shower	<input type="checkbox"/> 5323	Snap-on Pipe Insulation	<input type="checkbox"/> 5378d	Heat-transfer Pumps	<input type="checkbox"/> 5438	Shock Absorbers
<input type="checkbox"/> 5261	Corrosion-resistant Sump Pump	<input type="checkbox"/> 5324	Check Valve	<input type="checkbox"/> 5379	Chemical Pumps	<input type="checkbox"/> 5439	Manways & Fittings
<input type="checkbox"/> 5262	Loading and Unloading Platform	<input type="checkbox"/> 5325	Wide-roll Pipe Cutter	<input type="checkbox"/> 5380	Acrylonitrile	<input type="checkbox"/> 5440a	Colloid Mills
<input type="checkbox"/> 5263	Tank Vents	<input type="checkbox"/> 5326	Filter Paper	<input type="checkbox"/> 5381	Check Valves	<input type="checkbox"/> 5440b	Lab Homogenizers
<input type="checkbox"/> 5264	Tube Fittings	<input type="checkbox"/> 5327	Couplings	<input type="checkbox"/> 5382	Gravity and Power Belt Conveyors	<input type="checkbox"/> 5440c	Technical Assistance
<input type="checkbox"/> 5265a	Fume Hoods	<input type="checkbox"/> 5328	Dust Collectors	<input type="checkbox"/> 5383	Stainless Steel Pipe and Tube	<input type="checkbox"/> 5440d	Sub-micron Dispersers
<input type="checkbox"/> 5265b	Laboratory Furniture	<input type="checkbox"/> 5329	Ion Exchanger	<input type="checkbox"/> 5384	Meters	<input type="checkbox"/> 5441	Purifiers
<input type="checkbox"/> 5266	Vacuum Pumps	<input type="checkbox"/> 5330a	Double-shell Dryers	<input type="checkbox"/> 5385	Torque Wrenches	<input type="checkbox"/> 5442a	Drum Lifter
<input type="checkbox"/> 5267	Colorimeter Analyzers	<input type="checkbox"/> 5330b	Steam-tube Dryers	<input type="checkbox"/> 5386	Insulating Products	<input type="checkbox"/> 5442b	Barrel & Box Grab
<input type="checkbox"/> 5268	Laboratory Equipment	<input type="checkbox"/> 5331	Solvent-resistant Lubricant	<input type="checkbox"/> 5387	Precipitator Automation System	<input type="checkbox"/> 5442c	Barrel Truck
<input type="checkbox"/> 5269	Centrifugal Pumps	<input type="checkbox"/> 5332	Packings, Gaskets, Seals	<input type="checkbox"/> 5388	Bulk Transportation Trailer	<input type="checkbox"/> 5443	Corrosion-resistant Pumps
<input type="checkbox"/> 5270	Stainless & Monel Utensils	<input type="checkbox"/> 5333	Vari-speed Motodrives	<input type="checkbox"/> 5389	Differential Transformers	<input type="checkbox"/> 5444	Portable Mixers
<input type="checkbox"/> 5271	Hardness Gage	<input type="checkbox"/> 5334	"Y" Globe Valves	<input type="checkbox"/> 5390	Rotary Table Marking Machine	<input type="checkbox"/> 5445a	Specific Gravity Separators
<input type="checkbox"/> 5272	Heating Mantles	<input type="checkbox"/> 5335	Threadless Pipe Fittings	<input type="checkbox"/> 5391	Ejecto Pumps	<input type="checkbox"/> 5445b	Mechanical Graders
<input type="checkbox"/> 5273	Industrial Pumps	<input type="checkbox"/> 5336a	Evaporators	<input type="checkbox"/> 5392	High-pressure Compressor	<input type="checkbox"/> 5445c	Magnetic Separators
<input type="checkbox"/> 5274	Spray Nozzles	<input type="checkbox"/> 5336b	Filters	<input type="checkbox"/> 5393	Nickel Alloys	<input type="checkbox"/> 5446	Platinum Lab Ware
<input type="checkbox"/> 5275	Glassware Sleeves	<input type="checkbox"/> 5336c	Condensers	<input type="checkbox"/> 5394	Rotary Feeder	<input type="checkbox"/> 5447	Rotary Joint
<input type="checkbox"/> 5276	Filter Media (see ad—state which)	<input type="checkbox"/> 5336d	Heavy Castings	<input type="checkbox"/> 5395	Controllers Cooling Towers	<input type="checkbox"/> 5448a	Tank Top Agitators
<input type="checkbox"/> 5277	Heating Units	<input type="checkbox"/> 5336e	Flakers	<input type="checkbox"/> 5396	Laboratory Freezers	<input type="checkbox"/> 5448b	Portable & Tripod Mixers
<input type="checkbox"/> 5278	Experimental Mixers	<input type="checkbox"/> 5336f	Heat Exchangers	<input type="checkbox"/> 5397	Gas Generators	<input type="checkbox"/> 5448c	Side Entering Mixers
<input type="checkbox"/> 5279	Paper Chromatography and Electrophoresis Equipment	<input type="checkbox"/> 5337	Processing Equipment	<input type="checkbox"/> 5398	Ventilators	<input type="checkbox"/> 5448d	Pipeline-Flomix
<input type="checkbox"/> 5280a	Laboratory Ware	<input type="checkbox"/> 5338	Wet-pit Pumps (state use)	<input type="checkbox"/> 5399a	Check Valves	<input type="checkbox"/> 5450	Rotary Pumps
<input type="checkbox"/> 5280b	Sheet, Tubing, Wire, etc.	<input type="checkbox"/> 5339	Management Information			<input type="checkbox"/> 5451	Proportioning Pump
<input type="checkbox"/> 5280c	Purifier	<input type="checkbox"/> 5340	Caustic Dehydrating System			<input type="checkbox"/> 5452	Humidity Control System
<input type="checkbox"/> 5280d	Indicators	<input type="checkbox"/> 5341	Lift Truck Transmission			<input type="checkbox"/> 5453	Teflon Packings
<input type="checkbox"/> 5281a	Steel & Alloy Fabrications					<input type="checkbox"/> 5454	Butterfly Valves
						<input type="checkbox"/> 5455	Concrete Waterproofing
						<input type="checkbox"/> 5456	Paraformaldehyde

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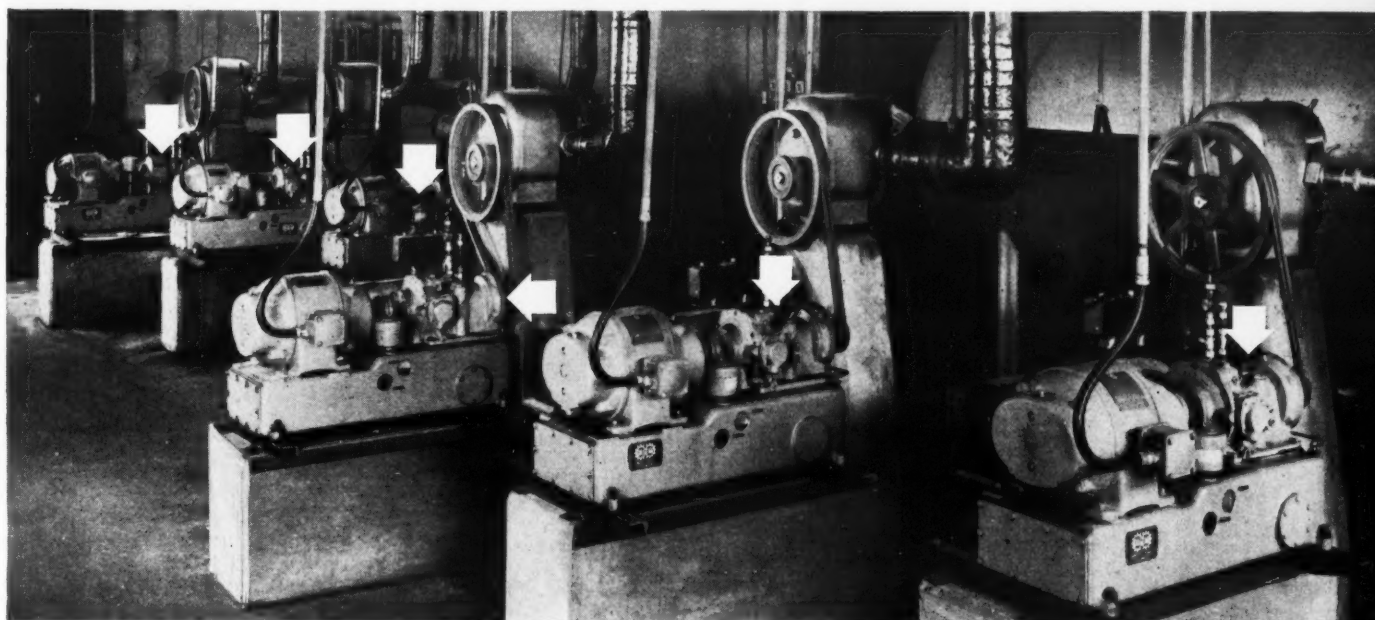
From Oilgear Application-Engineering Files

HOW OILGEAR DRIVE AND CONTROL SYSTEM STABILIZED BEER FILLING LEVEL

CUSTOMER: *Large Western Brewery (Name withheld by request)*

DATA: Highly carbonated beverages must be handled gently. Throttling flow of beer into filling machine reservoirs causes foam and irregularity of liquid height, making accurate filling of cans or bottles difficult. These reservoirs are small compared to the flow through them. Costly losses are incurred on tax-paid cans "in process" due to under or overfilling. Any beer

pump drive-control system must respond immediately, have smooth action, and be unaffected by daily wash-downs required to maintain sanitary operations. Accurate automatic control, dependable operation, and ease of maintenance—as always—are important factors in the selection of this equipment.



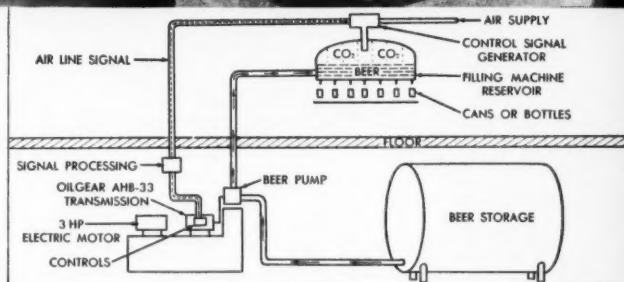
SOLUTION: Shown "on the job" above, are 6 Oilgear AHB-33, two-way, "Any-Speed" transmissions driven by 3 hp electric motors, mounted on standard reservoir bases. Transmissions drive beer pumps through dual "V" belts. Beer is pumped from storage tanks to bottle or can filling machine reservoirs on the floor above. Liquid level in filling reservoirs is controlled automatically by a low pressure CO₂ signal . . . as level rises, pressure rises . . . as level falls, pressure falls. Translated to air pressure signals, which, transmitted to controls on Oilgear transmissions, automatically-instantly increase, decrease, reverse, or stop the beer pumps. Where former throttling system caused foam and irregular levels, this Oilgear system holds reservoir level to $\pm \frac{1}{16}$ " under continuous operation . . . assuring accurate filling of each can or bottle. Beer pumps are flushed under water pressure without disconnecting drives. Several years of continuous service have proven drives to be extremely dependable under all conditions, with little or no attention.

Oilgear Application-Engineering can also provide practical solutions to your linear or rotary drive problems. Call the factory-trained Oilgear application-engineer in your vicinity. Or write, stating your specific requirements, directly to . . .

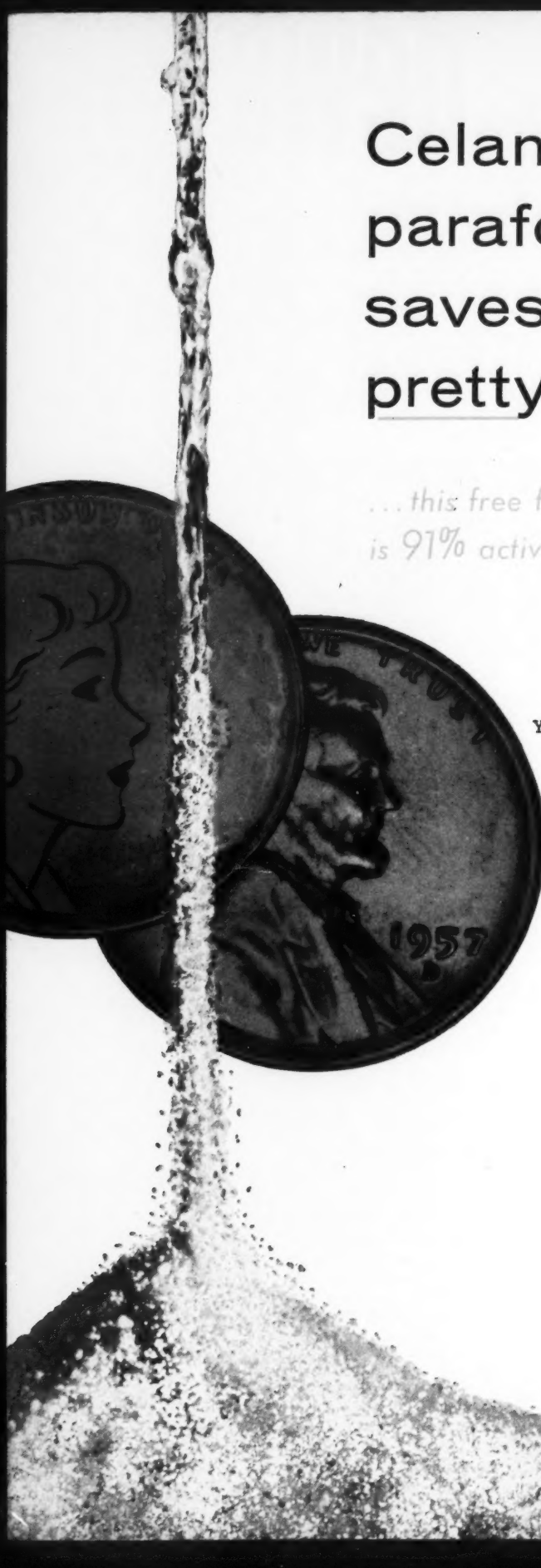
THE OILGEAR COMPANY

Application-Engineered Fluid Power Systems

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Similar Oilgear "Any-Speed" drives have improved performance on can closing, filling; paper, printing, textile, tape, and rubber processing machines; extruders, capstans, winders, stokers, centrifuges, gang-saw feeds, saw mill carriages, conveyors, and the like. They provide efficient conversion of any constant rotary motion to accurately controlled variable rotary motion . . . smooth, stepless, uniform acceleration from zero to maximum in either direction . . . manual, hydraulic, electric or electro-hydraulic controls—providing complete flexibility of location . . . low power consumption—using power only in proportion to work performed . . . durable, trouble-free, low maintenance due to simplicity and automatic lubrication of all rotating parts.



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